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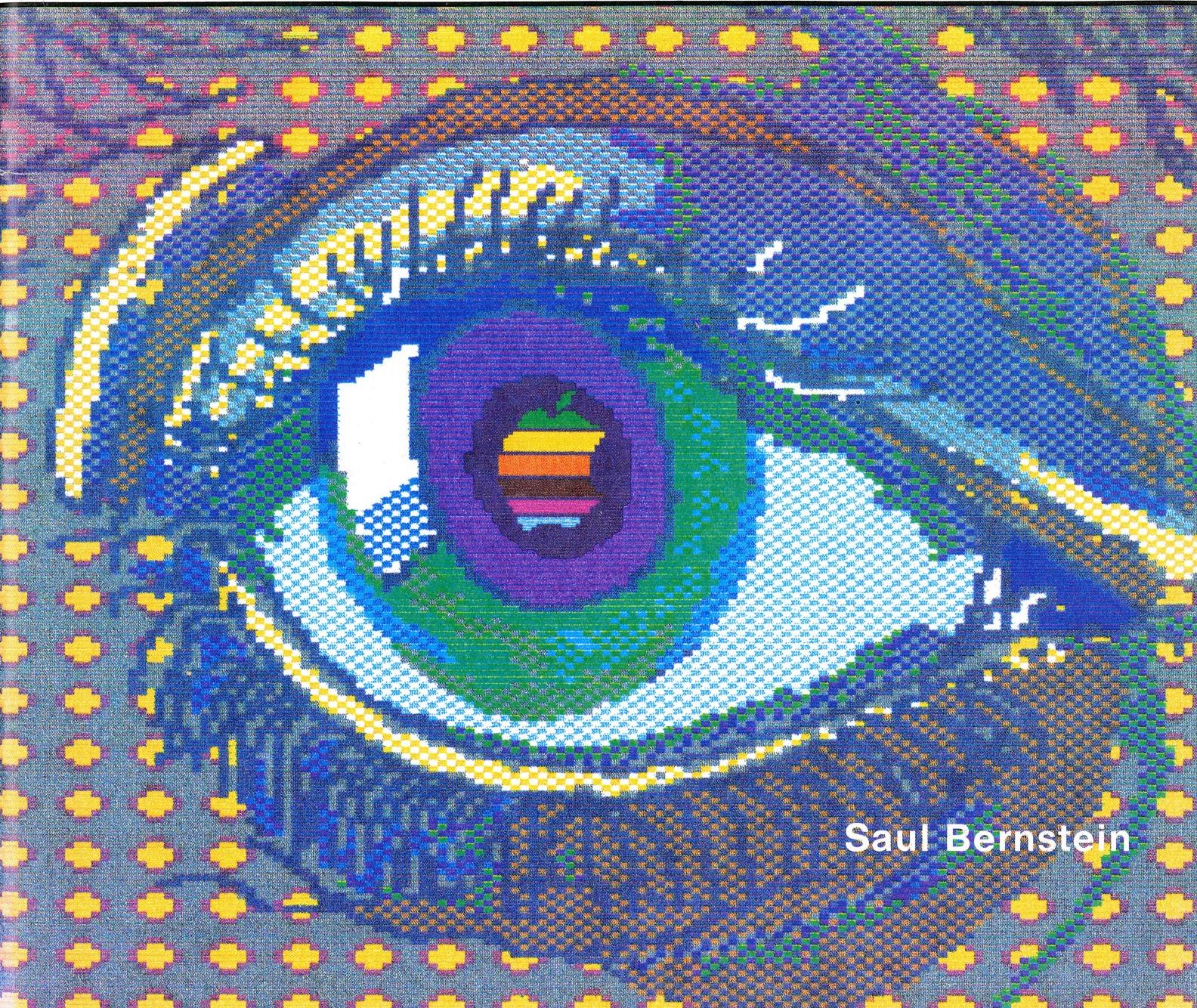
The Premier Magazine for Apple Computer Users

TM

VOLUME 3 NUMBER 3

JULY - AUGUST 1982

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Saul Bernstein

THE PROWRITER COMETH.

(And It Cometh On Like Gangbusters.)



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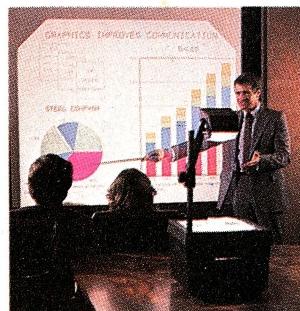
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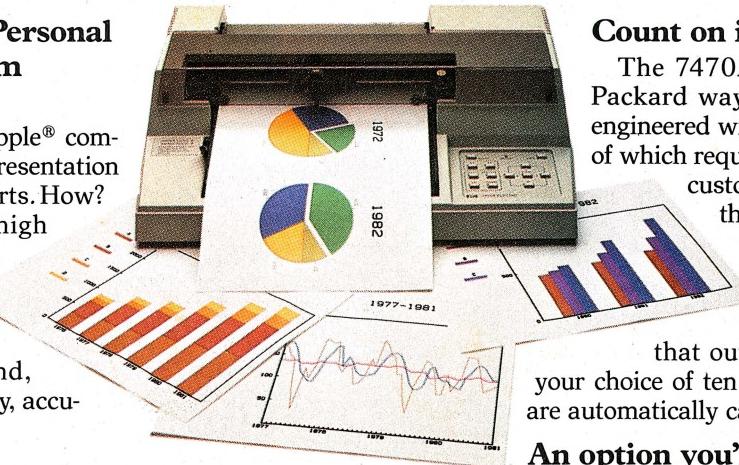
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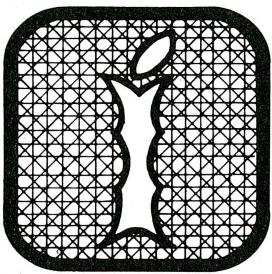
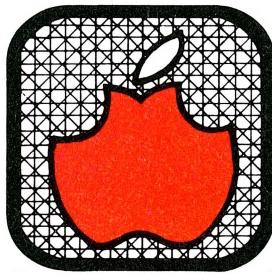
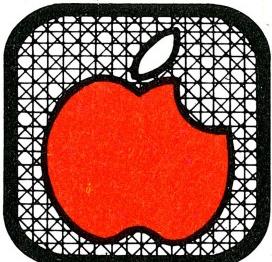
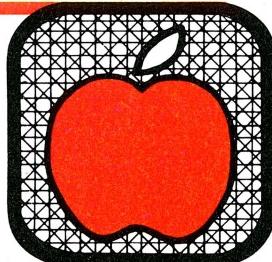
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Take a bite...



Vol. 3, No. 3

July - August 1982

Cover: by Saul Bernstein.

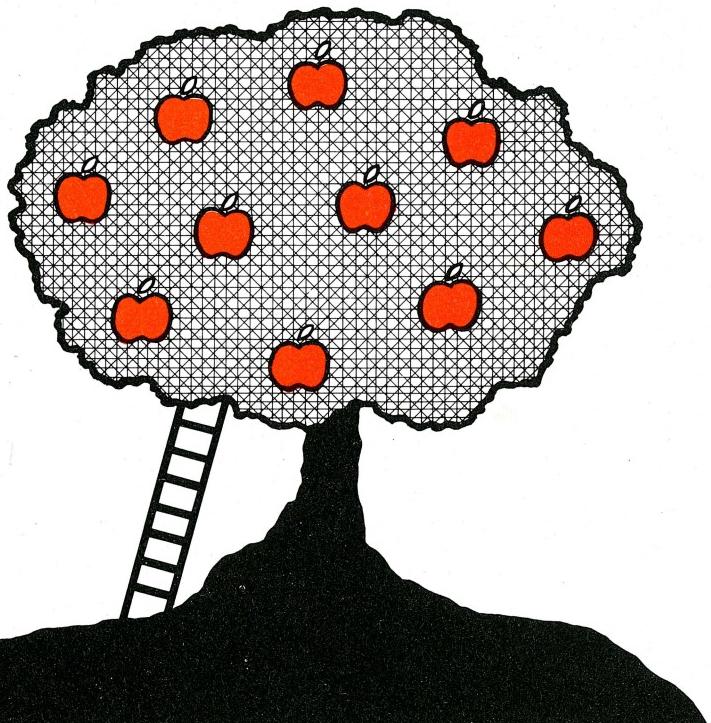
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Apple Orchard



Vol. 3, No. 3

July - August 1982

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advertising material, manuscripts, etc.:

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910A George Street
Santa Clara, CA 95050
(408) 727 - 7652

APPLE ORCHARD (ISSN 0277 - 1950) is published bi-monthly by the International Apple Core, Inc., 910A George St., Santa Clara, CA 95050. Second Class Postage paid at Santa Clara, CA and Forest Park, IL.

Subscription Rates: \$15.00 for six issues in the U.S.; \$22.50 (US funds) in Canada, Mexico, and APO/FPO addresses; and \$27.50 (US funds) for addresses elsewhere.

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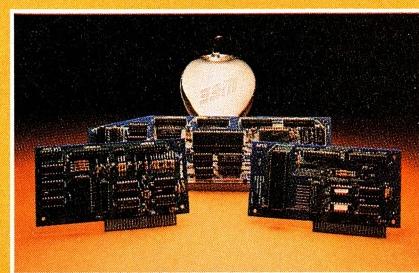
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The Transformation People

TEXTFILE

For this issue, we have an array of articles both colorful and informative, thanks to the efforts of a number of Apple users. As the cover indicates, we focus on computer art as opposed to computer graphics. Saul Bernstein is a leading practitioner of that activity; we hope you enjoy your visit with him, and some of the output from his PrintaColor printer. The print-outs have not been "doctored"; that's the way they came off this classy machine.

Joe Sobel's series on VisiCalc tips and techniques, with Barry Bayer, begins on Page 48. We should note that these articles contain material from a forthcoming book on this subject; the tips should help you to get more out of the program.

We also share with you some unreleased information about an expected new version of VisiCalc, and we attempt to chronicle the efforts of an

intrepid reporter to penetrate the pervasive curtain of secrecy in which many companies cloak their products. We don't mean to pick on Software Arts in particular, but it becomes almost ludicrous to watch people labor to conceal information which may not be all that breathtaking to the rest of the world.

The first Applefest, in Boston, coinciding with the IAC's Annual Meeting, was a colorful and informative affair; if you can get to one of these around the country, try and do so. We thank the many folks who offered words of encouragement for this publication in Boston.

Two short excursions into machine routines are provided by Peter Baum (the "Running Jump"), and Dave Lingwood (INPUT and the &). If you're afraid to try these out, remember that you can't hurt your Apple from the keyboard.

For Pascal users, we present the promised Hardware Independent Terminal program by Bill Shepard. This one follows our interest in the portability of Pascal, but should be of interest to anyone seeking ways to modify or customize commands to their own taste.

And, Trish Livingston's charming glimpse into life in Alaska with an Apple, coupled with Dick Davies' illustration, brightened our place for days; let it do the same for you.

Next, an acknowledgment: In Neil Lipson's article "Make the Devil Do it" in our May-June issue, we didn't make clear that Dr. Cliff Howard provided some of the user-developed information presented in the article. He did, and we thank him.

As always, your comments are welcome.

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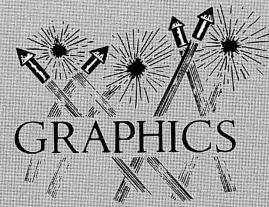
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Best of all, with just this starter package, you'll have the routines to put High Resolution **graphics** and **sound** in your programs immediately! Also included is a versatile **print using** module to banish the "decimal point demons" forever! To round out the package, we've also included powerful **search** and **sort** routines (for single dimension arrays; Search: 1000 elements in 1 second, Sort: 1000

elements in 90 seconds), and a number of other often-needed routines as well (30 routines in all).

Additional library disks titled "**Ampersoft Program Library**" are already available.

Some of the other routines in The Routine Machine (plus others not listed) are:

SWAP: Swaps two string or numeric values.

TEXT OUTPUT: Prints with no "word break" on screen.

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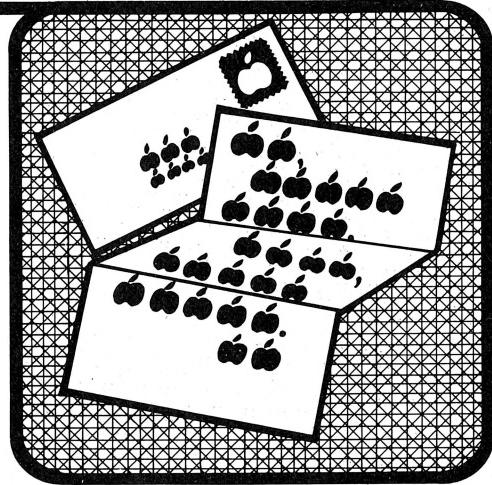
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Letters to the Editor



The Apple /// (con'td.)

Sir:

This past weekend I went to the AppleFest in Boston, and when they finally opened the doors I headed straight to the Apple booth with the hope that I would go away ready to buy an Apple /// from a dealer. When I showed a program worked out on a DB Master, I was immediately discouraged and spent the rest of the day searching for ways to improve my Apple II.

I received lots of good advice and picked up many brochures, but came home Saturday with a \$15 book on VisiCalc. Incidentally, one joker told me that VisiCalc was for the Apple II only.

Your *Planting A Seed* on "The Vanishing Hacker" in the May-June issue really threw me. There is no "hacker spirit" in me, and never will be. Many others at the AppleFest were, like me, looking for better products, and ready to spend plenty to avoid "hacking". May I suggest you pay more attention to "users" when publishing Apple /// articles. As an example, the Diablo article (May-June 1982) refers only to the II. A word or two re the Apple /// would be sufficient. Is there a buffer for the /// to run the printer while I continue on the computer? Please tell us more about products and what works with what for smooth and relatively simple operation.

Walter Averill
Poughkeepsie, NY

(First, by interchanging Pins 2 and 3 on the RS-232 connector, the Diablo works as well with a /// as with a II. The problem is with locked software that forces a printer to be in Slot 1 or 2, while the /// looks for Slot 7. Now: let's hear from everyone who has matched up different manufacturers' products, including difficulties. These don't have to be long, formal articles; we'll bunch 'em up and publish them.—PCW.)

Sir:

I would like to thank the IAC Directors and Officers for their decision to support the Apple ///. That letter in the Winter 1981 issue really set me back; doesn't the writer realize that the success of Apple Computer benefits all Apple owners? Yes, the /// has had its problems, but that is now history.

The two biggest problems I have right now with the /// are lack of software and dealer inexperience. When I first got my ///, my dealer didn't know how to configure the disks to work with a printer. After waiting for two weeks, I called the Apple Tech Support in Dallas and got the answer in one day. Another problem was getting my Epson MX-100 to print. This time Epson had the answer that neither my dealer nor Apple had: take Pin 14 and ground it to Pin 16. (This was for the Apple ribbon cable.) After making this change I was able to print Apple /// programs with no problems. But with some Apple II purchased programs, I can't generate a line feed. (And, of course, you can't modify the locked software, either...—PCW.)

Despite manual re-issues, I have not found a true manual that teaches Business BASIC. I am looking forward to more articles on the Apple ///.

Dale Means

Unlock and Learn

Sir:

One of the greatest pleasures of owning an Apple or other personal computer comes from learning, and one of the best ways to learn is to review and try to

understand what others have done previously. Then you can customize programs to suit your own specific needs, or write your own with the knowledge gained. This is the way most of the early greats in micros learned. However, this is impossible when you can't list the program or make your own modifications. The learning process ends before it begins. Further, a great many commercial programs would be much more valuable to the user if modifications were possible (not to mention the much-discussed problem of backing up disks). Locking the program actually makes the program less valuable to the user, and may even reduce future sales. We believe this to be undesirable, and when we introduced *The Quest for the Holy Grail* we decided not to copy-protect our disks. The risks involved in "going bare" are outweighed by the value to the user and the basic fairness of providing quality software which can be listed, understood, and legitimately backed up.

We are not condoning piracy; pirates are not romantic heroes, and should be punished for illegal acts.

We believe, however, that the vast majority of users is honest. We also believe that the microcomputer industry as a whole, and the Apple community in particular, will benefit from the most complete exchange of ideas and information possible, consistent with the legitimate rights of software producers to adequate compensation. As authors and publishers, we recognize and understand the arguments for protection; but as users and enthusiasts, we oppose uncopyable, and by their nature unlistable and unmodifiable, programs.

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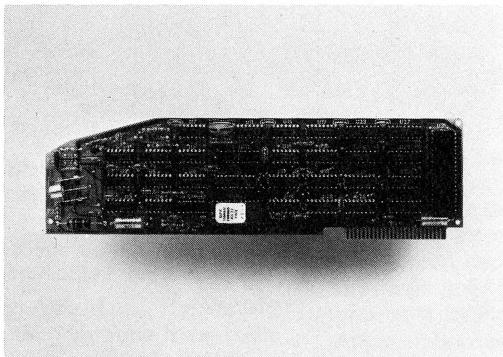
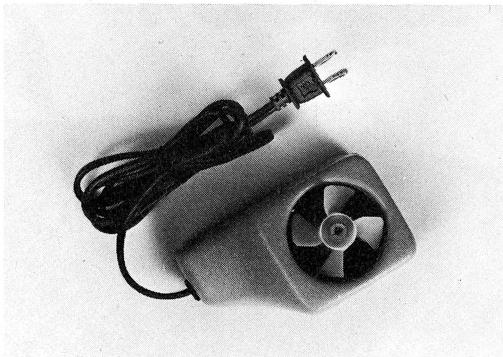


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- Weighs only 18 oz.



SUP'R'TERMINAL

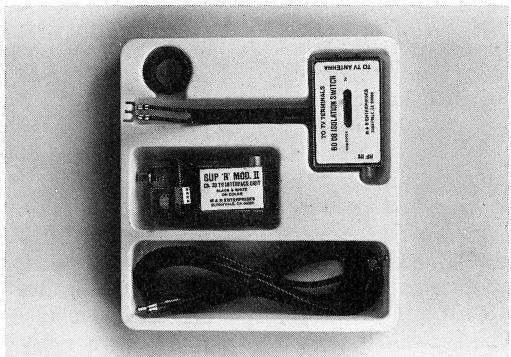
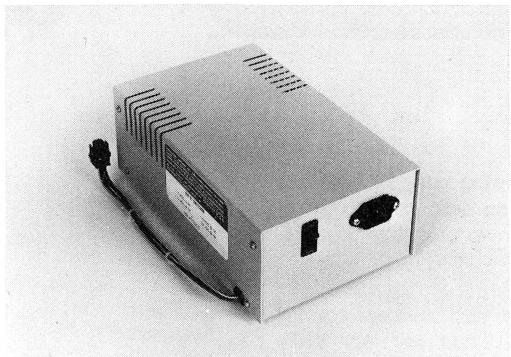
- 80 Columns by 24 lines, upper and lower case; all 128 ASCII characters
- Includes an Upper and Lower case 5x8 dot matrix ASCII character set, and inverse alpha characters
- Character set can be user definable
- Shift Lock feature
- Works with APPLE PASCAL and APPLE BASIC
- Compatible with ALL APPLE II peripherals
- CP/M Output cursor*
- Pascal 1.1 Keypress and type ahead in firmware*
- 3K bytes of bank switched static ram
- 2K bytes of ROM
- The only board with continuous direct memory mapped screened ram
- The only board that interprets VTABS by firmware (version 2.2)
- The only board with an adjustable scrolling window
- The only 80 column board that is synchronous with the APPLE II
- Fully programmable cursor
- Works with CORVUS and NESTAR Systems

*Version 2.5

APPLE II is a trademark of APPLE Computer Co.
CP/M is a trademark of Digital Research

SUP'R'SWITCHER

- 90 to 135 VAC/60Hz or 180 to 270 VAC/50Hz input
- Fully protected — voltage/current
- Overvoltage protection
- 0-50 C full load operating temperature
- Output voltage current
+5V @ 6A -12V @ 1A
+12V @ 1A -5V @ 1A
- Weight— $2\frac{1}{4}$ lbs
- Size 3 $\frac{3}{4}$ " H 9 $\frac{3}{4}$ " D 6 $\frac{1}{4}$ " W
- Mounts on left side of Apple II
- Sufficient current to handle all 8 slots
- Plugs directly into the Apple II motherboard



SUP'R'MOD II

The SUP'R'MOD II is a wide band black and white or color compatible interface system intended to convert the home TV to a full video display for home computers, CCTV cameras and similar systems which output NTSC compatible composite video. The SUP'R'MOD II is pre-tuned to U.S. channel 33 (UHF), includes a coaxial cable and antenna transformer, and in conjunction with a standard home TV set, insures safe isolation and high performance.

SYMBOL	DESCRIPTION	TYPICAL	UNIT
F _c	Vision Carrier	591.5	MHz \pm 0.5
I _{cc}	Supply Current	2.0	mA
V _O (Hi)	RF Output, V _{mod} = 0	1.5	Mv
V _O (Low)	RF Output, V _{mod} = 1.5	-20.0	dB
R _{in} (mod)	Modulation input resistance	700.0	Ohm
V _{os} _c (Min)	Oscillator stop voltage	2.0	Volt
V _c	Voltage	+5 to +12	Volts DC



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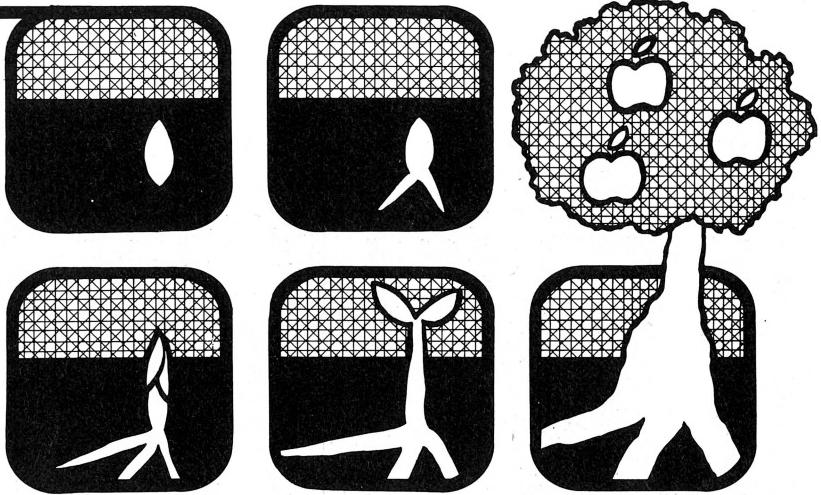
SUP'R'SWITCHER

SUP'R'FAN

SUP'R'TERMINAL

SUP'R'MOD II

Planting a seed...



THE STANDARDIZATION QUEST

Once upon a time in the United States, a train belonging to one railroad would not necessarily operate on the tracks of another. Track gauges (distance between the rails) were different, coupling devices (interfaces) between cars were of different, incompatible designs, and other mechanical apparatus was not likely to be compatible. Each railroad's mechanical department had its own idea of what was best. During the last years of the 19th Century, a gradual standardization process led to interchangeability of cars between railroads; a more efficient rail system contributed to the growth of America . . . and to greater profitability for users as well as the railroads.

Once upon a time, the telephone facilities of the United States were local in nature; often, two separate companies served a locality, requiring a customer to have more than one telephone in order to reach everyone in the town. The systems used different electronic parameters; voltages, etc. Each company's engineers knew that their own approach was best. Long distance connections were a laughable dream. During the first years of the 20th Century, a gradual standardization process led to improved access by people, and a more efficient telephone system contributed to world growth . . . and to greater profitability for users as well as telephone companies.

Once upon a time (a time which has come, but not gone), Apple microcomputer users were required to overcome many problems of non-standard electronic and user interfaces in order to use their machines. A proliferation of hardware and software products existed, with little regard for any other product. Programs worked only with some hardware configurations; the presence of certain hardware would cause some software to crash the system. On another level, the same keyboard command would cause startlingly different results with different programs. **CTRL-C** accepts data in Pascal, but halts most BASIC programs. And the word processors! Well, let's just say that each company's guiding technical genius has his/her own idea of the best approach to take on any problem. Just ask them!

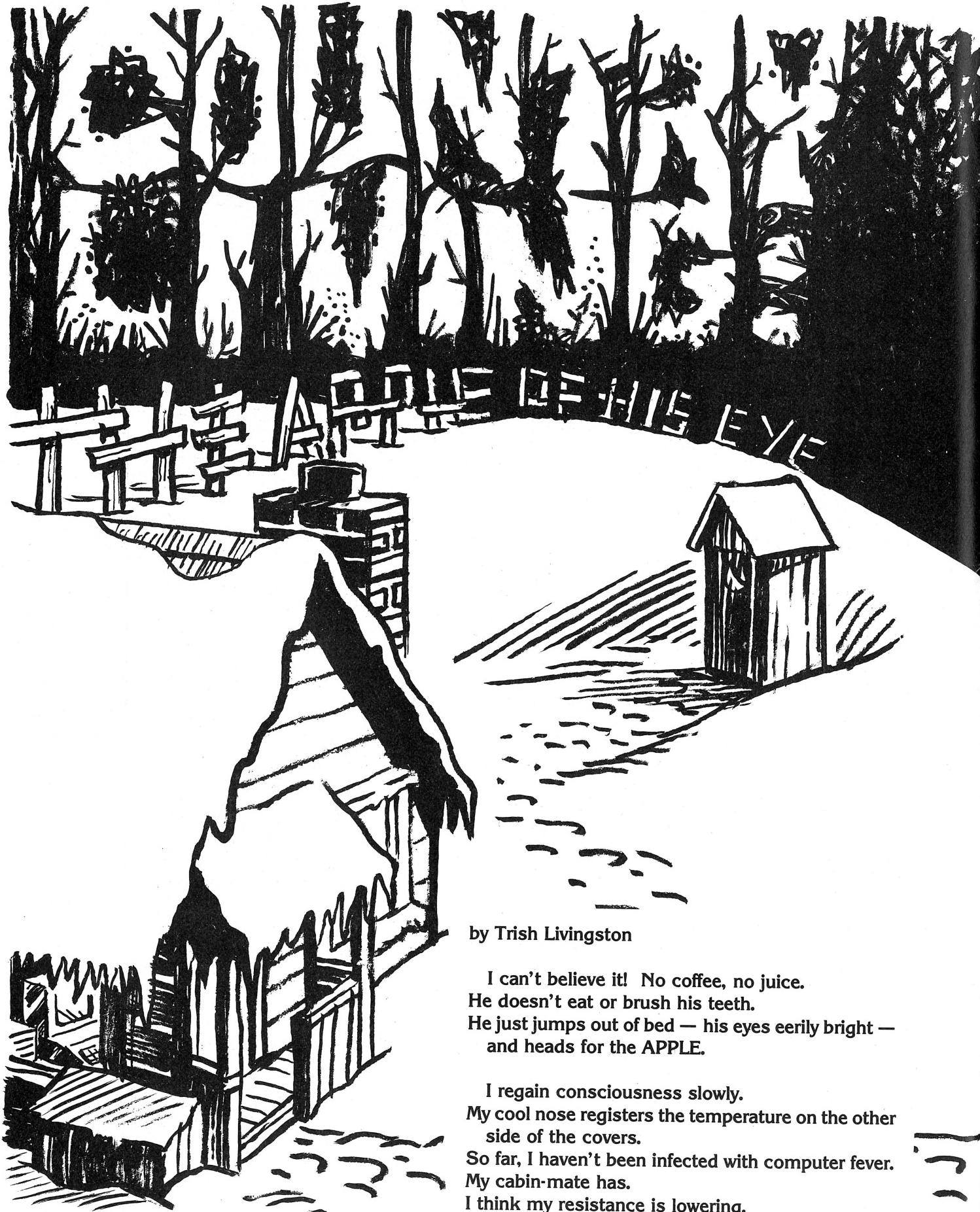
And while they impose their methods on us, prepare for the frustrating consequences of having Program A do something entirely different than Program B in response to the same keyboard command which you entered out of habit. And the manufacturers' answer that *you* must adapt to the *program* has something backwards; we thought it was the computer that was going to help *us*!

Well, we have "standards" of a sort now; every user is establishing his/her own. Example: I stopped going crazy and learned to love Pascal after I modified the SYSTEM MISCINFO so that **CTRL-W** and **CTRL-Z** caused the cursor to go up and down one-handedly, just like my faithful Professional Easywriter, rather than the idiotic **CTRL-O** and **CTRL-L** that the Pascal started with. Thanks to Apple for making that command set modifiable. (And if you're upset about my calling that method "idiotic", you confirm my suspicion that any committee working on standardization is going to have a tough job ahead of it.)

Despite difficulty, the International Apple Core has a Standards Committee, which may provide the mechanism for putting things back into perspective during the last years of the 20th Century. What's needed now is *your* ideas, first on *what* should be standardized (and what should be left alone), and then *how*. Or maybe what should be left user-modifiable, for our own personal standards.

Be advised that the IAC and **APPLE ORCHARD** are working to apply a bit of common sense, to contribute to growth, and to better systems for all users.

Let us hear from you. Every month that passes makes standardization more difficult.



by Trish Livingston

I can't believe it! No coffee, no juice.
He doesn't eat or brush his teeth.
He just jumps out of bed — his eyes eerily bright —
and heads for the APPLE.

I regain consciousness slowly.
My cool nose registers the temperature on the other
side of the covers.
So far, I haven't been infected with computer fever.
My cabin-mate has.
I think my resistance is lowering.

I rebuild the fire, don parka and boots, and amble towards the outhouse.

I survey the countryside — rolling hills of spruce melting into the flat expanse of tundra, smoke rising from the cabin by the tracks. Air, cold and clean, clears my head of dream wisps. I pull my ruff closer to my face. Feels like thirty below again today.

The sun stretches her pale pink fingers through the icy air.

I stretch too, as a warming peppermint tea slips through me. Sunday. A time to celebrate the week past and to look forward to the week ahead.

Waffles and Vermont maple syrup. Splitting wood for the week, and a cross country ski. Electronic beeps, bleeps, whirs and whizzes are a strange accompaniment for yoga.

As children of the Twentieth Century, it's difficult to find a blend of old and new that's satisfying.

We have an outhouse and a home computer; no running water and a Paper Tiger; wood heat and software to get us through the winter.

I sense that I should learn the ways of these new computers.

As I am now familiar with the rhythms of country life, I should be at home with computers.

I know that when I first used an IBM Selectric II, my mind moved in new patterns.

I can now spell backwards with facility.

I see the boys at the supermarkets, in the pizza houses, rapidly adept at Space Wars and Invaders.

I know they know things I don't.

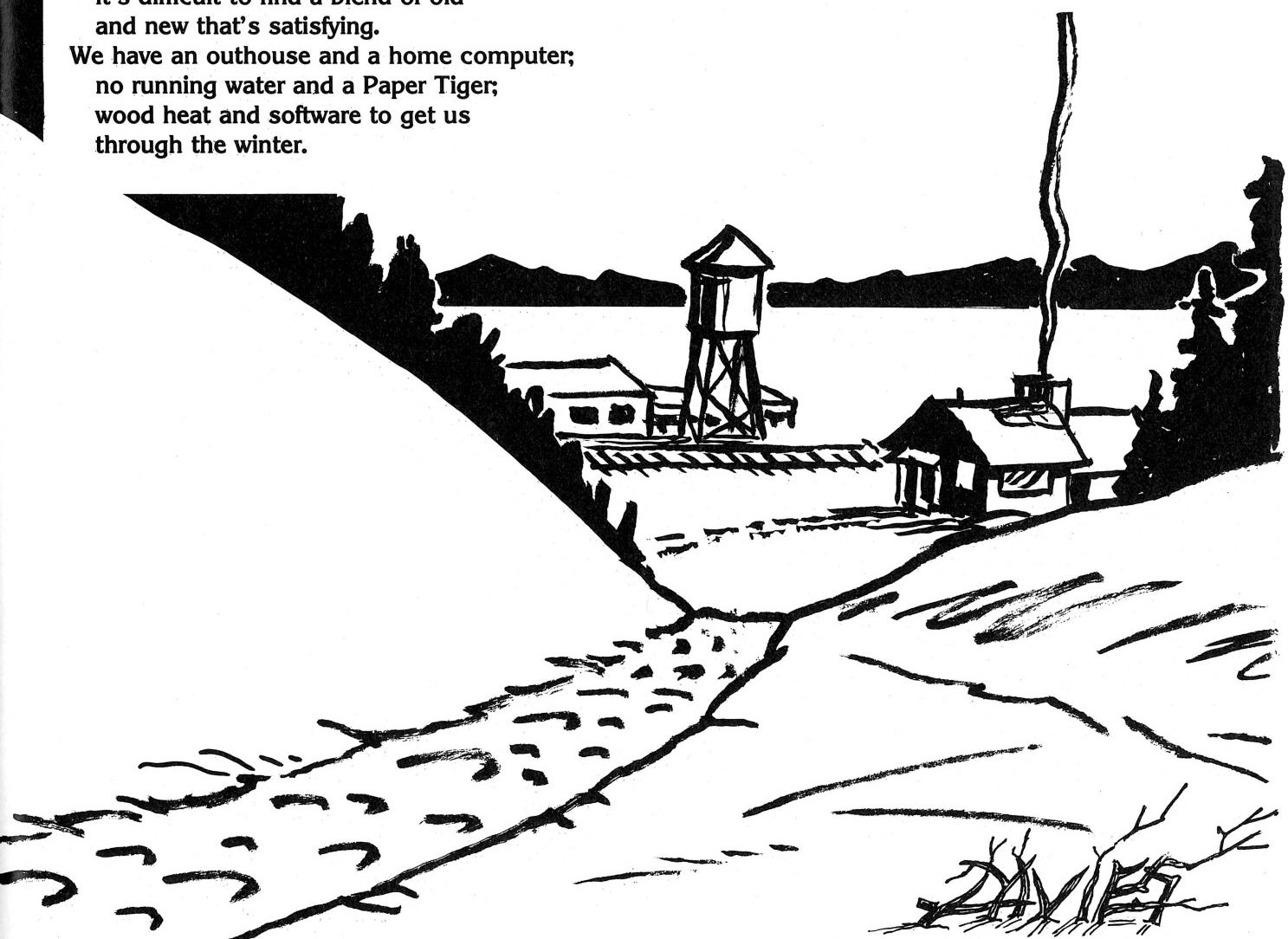
I did write these thoughts with the Word Processor.

I look for the Princess, and I love playing Decathlon.

I learn to embrace anachronisms; to celebrate splitting wood at 40 below zero and mastering the Apple II Plus.

Still, I doubt if I'll ever bound out of bed headed for the Apple.

For me, it'll be peppermint tea in the mornings.



**Coming
Soon...**

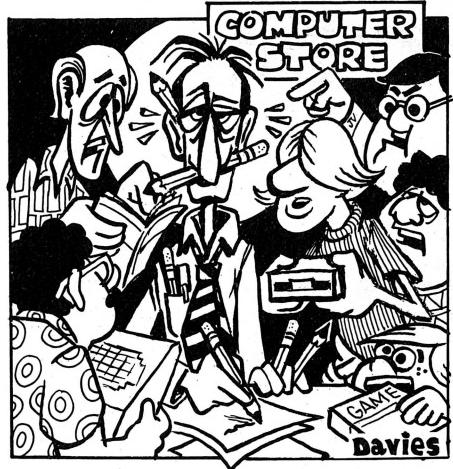
"What are the patches for Apple Fortran, and how do I modify the Apple Communication Card to operate at a higher speed?"

"What's the difference between the old Monitor ROM and the newer Auto-Start ROM?"

Sound familiar?

Here's a new way to deal with these and other technical questions, from Apple Computer, Inc., and the International Apple Core.

Most of the commonly asked questions dealing with both hardware and software will be in a new and valuable resource binder entitled "APPLE TECH NOTES".



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APPLE TECH NOTES will be updated four times a year, to keep the material current; the binder contains subscription information. To receive one of the first of these valuable resources, contact your local Apple Dealer NOW and place your order. Suggested retail price will be \$64.95.

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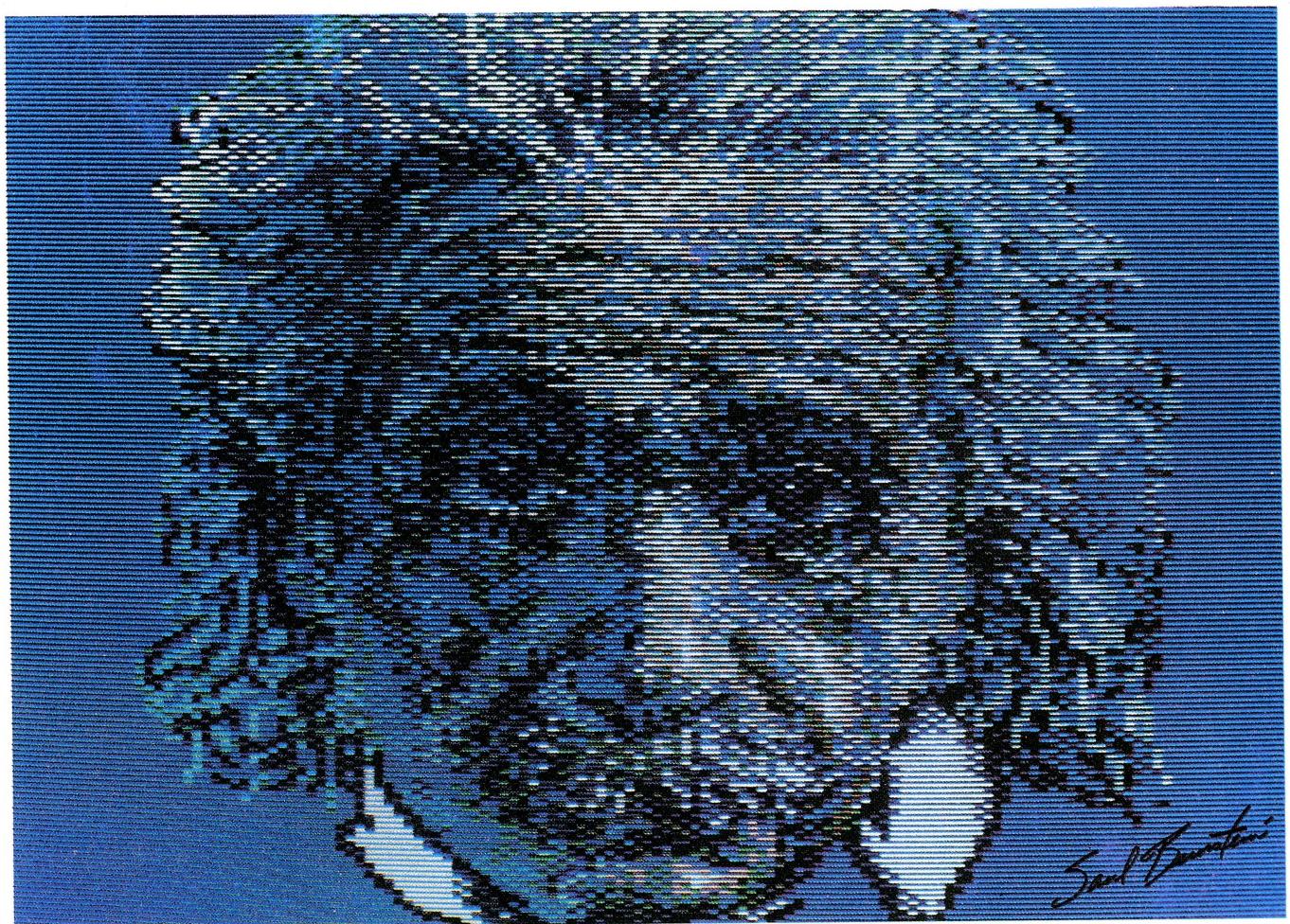
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A visit with . . .

Saul Bernstein



"If Rembrandt or Cezanne were alive today, they'd be using the computer."

The speaker is Saul Bernstein, responding to a question about whether computer graphics are in fact, "art".

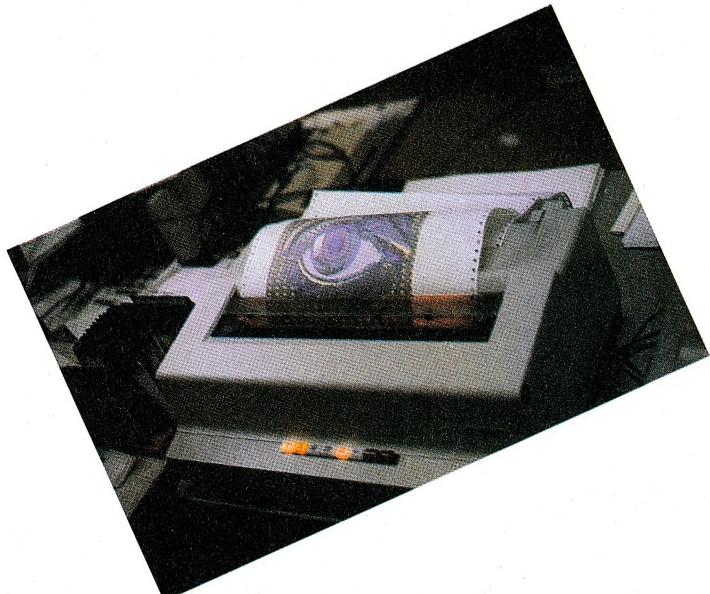
"Don't forget", he adds, "Goya, in his Eighties, left his home and family to take a long journey. Why? To investigate the newest technology of that time: lithography. These men were interested in the latest tools that would enhance their art. Why wouldn't it happen today?"

A television camera? Computers? In a studio attached to a home? This is a bit different. There has been considerable coverage of "computer graphics" as used by NASA, George Lucas and others, to bring us simulations of space flight. The wonders of picture creation at esoteric laboratories equipped with millions of dollars worth of computer equipment have not been denied us; we can see the results on TV or in the cinemas, particularly in commercials or show titles (as with a willow tree turning into a spray can of aftershave or cologne, etc).

One of the most popular stopping points at the West Coast Computer Faire this year was the booth at which Saul Bernstein had been invited to create computer portraits of various passers-by, and to show some other examples of his work. It was rare that a crowd was not gathered around Mr. Bernstein and his Apple /// with Graphics Tablet, watching images take shape. Even the art novice could see that this was different; the man was *painting*, not manipulating memory banks from a keyboard. The stylus was touched to a colored square, then to the Graphics Tablet surface, and the selected color instantly appeared at the corresponding spot on a monitor. The smell of turpentine was conspicuously absent. A visit to the home studio was clearly called for.



Mr. Bernstein, the Apple ///, and the Printacolor printer



We're in Mr. Bernstein's Thousand Oaks, California studio, a spacious room cluttered with the books and paraphernalia of image creation, and mementos of past triumphs. But despite his early brush/paint/paper artistic training, Saul Bernstein's studio relegates paint and brushes to a shelf on the far wall, behind the television camera and small scene diorama, and behind a videotape storage file. At Center Stage is an Apple ///; an Apple II has a supporting role to the right, along with a Printacolor, one of those new color ink-jet printers.

"Any art is a reflection of the technology of the day," Mr. Bernstein continues, briefly displaying another part of his career: as a Professor of Art at California State University, Northridge, where he has guided students for more than twenty years.

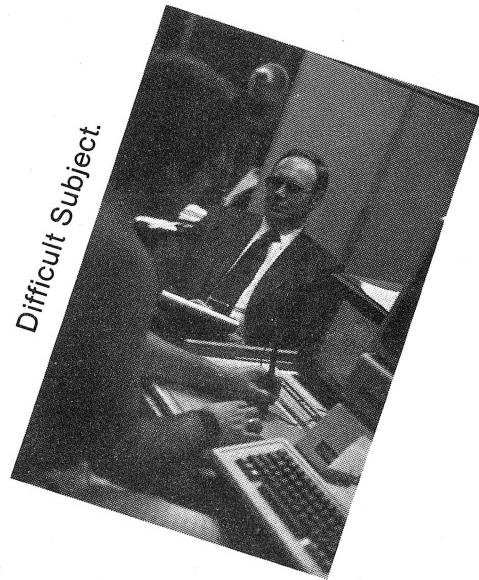
"My goal as an artist is fine art, whether on a canvas, or a video screen, or a wall; and whether an image gets on paper using a brush or a printer," he says. More than ten years ago, the artist/professor became interested in television as an instructional medium, and built a TV studio for his students, using early videotaping gear. The result was a group of 125 half-hour tapes which have enhanced and supplemented his art courses.

*Art is a reflection
of the
technology of the day.*

"The TV tube has conditioned us, and has changed the way we absorb information. There have been only two art forms in the history of man that presented themselves in a positive, active way; the stained glass window, and television. In both cases, the light is not just reflected; it comes from or through the viewing surface and attacks the retina. It's an uplifting experience, which is why the Church commissioned the best artists to create stained glass windows.

"But I had another dream: could I paint into a TV? The engineers I knew then said "No". Then a Computer Science guy said, "Yes you can, with a computer". But a computer was a very expensive machine in those days, so I just dreamed."

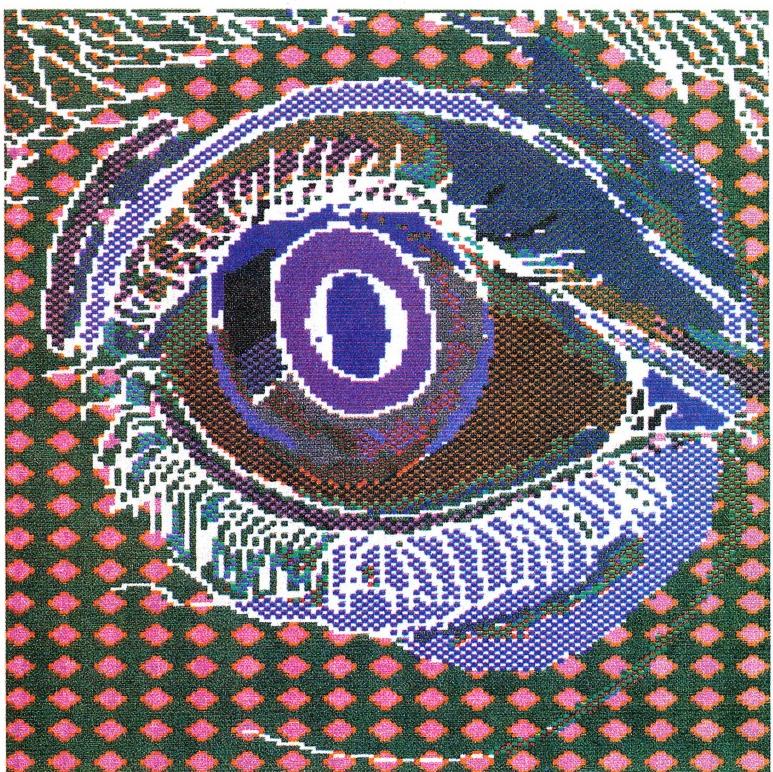
In 1978, Mr. Bernstein walked into a local computer store. "The salesman showed me an Apple II. When he punched up COLOR DEMO and I saw those color bars, that dream came true. I bought this Apple on the spot and began puzzling through the manual; it was all magic. But I needed help, and a computer person neighbor named Rod Mansfield helped me



out quite a bit, in those early days and since. Other Apple users helped too; this is a fantastic group."

Even before the advent of Apple's Graphics Tablet, Mr. Bernstein and his helpers had concocted an interface to a plotter; at a meeting in Cupertino, he was introduced to the Tablet, and Apple Computer was introduced to the concept of the computer's use for fine art. Says Apple's Phil Roybal, "Saul has given us the artist's view of the computer as a tool; he doesn't care so much *how* the computer does it, but he's very interested in the results." What was amazing to the Apple folks was the warm style; the idea that the computer could be used for more than "mechanical" graphics.

After about an hour of gradually becoming familiar with each other's frame of reference, Saul Bernstein and the Apple folks got on the same wavelength; the result was that Mr. Bernstein became a test site for the Graphics Tablet, and was invited on the first of his "painting" sessions, at the NCC in New York. Not surprisingly, it was wall-to-wall people. The Apple people sum up Mr. Bernstein's contribution this way: after seeing his work, people who had not thought about the computer for fine art began to think about it.



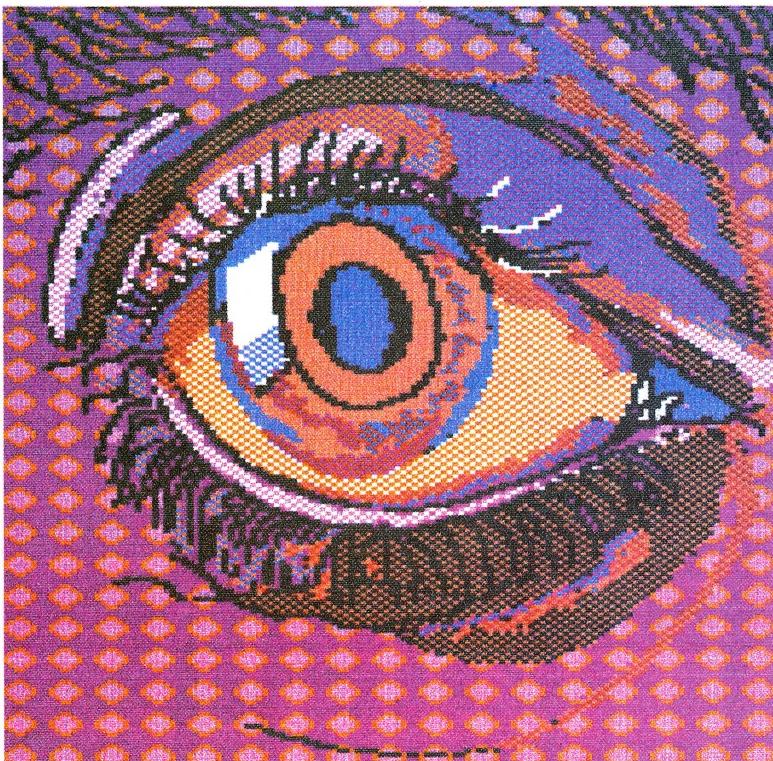
Connecting the Apple to a television screen and videotaping the results was a logical next step, and the software to do that was gradually developed. Television producers with

graphics problems began to hear about possible solutions in Thousand Oaks, and the phone began to ring. (It continued to ring intermittently during our visit.)

"We had a great deal of fun with a knitting instruction show for a PBS station. We were able to intercut live action with Apple graphics representing the stitching patterns and sequences. Graphics emphasizes the action much more clearly than a live close-up."

Mr. Bernstein is now engaged in creating a series of Apple computerized titles for a show due on a TV network; he didn't discuss details, but advised, "Watch *Remington Steele* on the NBC network this Fall; I think you'll recognize it."

That this work is commercial bothers him not at all. "Most of what we regard today as great works were in fact commissioned works, bought and paid for. It's no insult that the Church knew that the most effective way to communicate the Word of God in an era of high illiteracy was through fine art. You could view the Sistine Chapel as the world's largest billboard; the message gets across very well."



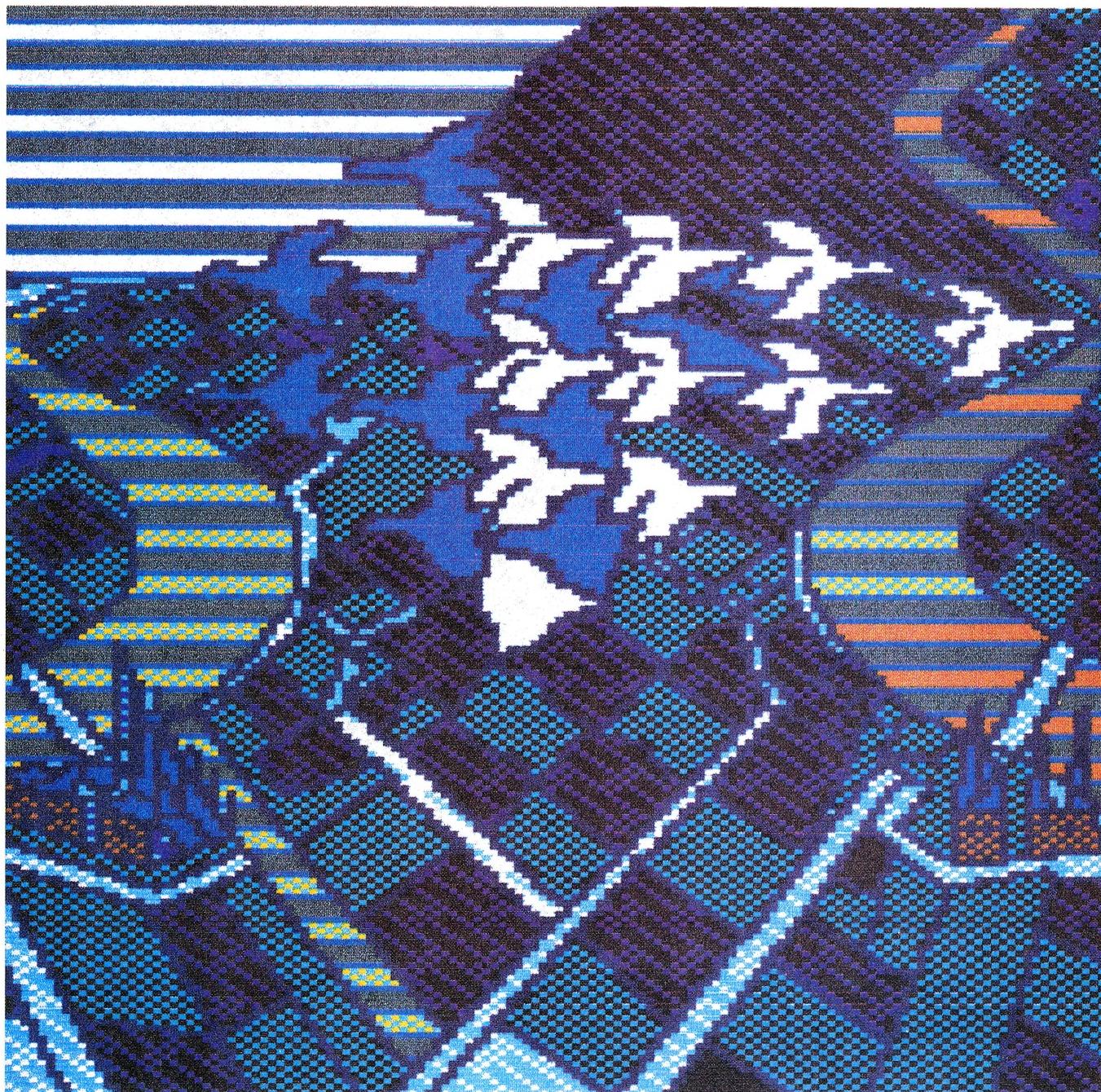
A distinction that permeates his work is that between "computer graphics" and "computer art". What Mr. Bernstein has found is a demand for a kind of high technology art that he calls "warm art", which does not betray the coldness of a machine. He says, "The equipment is there, but one reason why computer graphics on TV look cold is that the equipment is controlled by engineers, not artists. I'm not knocking engineers; it's a question of background, experience and talent. What they do have is greater technical resources."

Would Saul Bernstein "move up" from Apples, to larger computers

capable of even more spectacular effects? "Well, there's always the quest for greater resolution", he says. "But larger computers, so far, would mean joining an organization that could afford them. And that's not for me. I want to stay the shoemaker making the whole pair of shoes. Large organizations work by committee, and that's not for me. I see the artist being called in as a specialist, and being personally responsible for the result."

He predicts that the computer will be even more prevalent as an artist's tool. "The problem has been that the

computer is logical; it's been the *artist* that has been neither logical or programmable. Then too, many people, even artists, are reluctant to accept new things. And, the computer has had a bad image; it's used for draft notices, bank statements, etc. All of that is being overcome, thanks to microcomputers like the Apple. But if the *artist* doesn't understand what the computer really is, the danger is that he'll try to force the computer to *look like* water colors, oils, or whatever, to the detriment of both the artist and the computer." 



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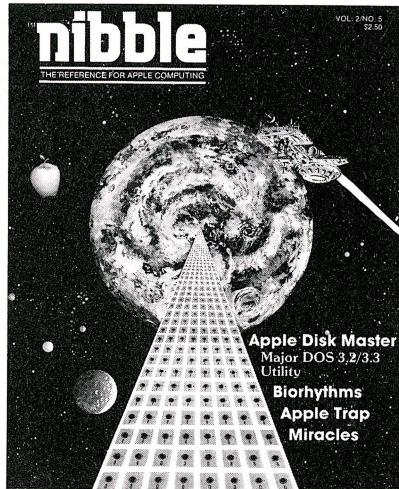
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TAKE A RUNNING JUMP

by Peter Baum
Apple Computer, Inc.

This article gives a brief example of how to set the RESET vector so that pushing the RESET key will execute a BASIC program. To start, grab your Apple II Reference Manual and read the section entitled "Autostart ROM Special Locations" starting on Page 37. Note the sentence, "Your programs can change the soft-entry (RESET) vector...", by loading memory locations #3F2 to \$3F4 with the appropriate destination for the RESET jump. If we load the proper memory location, then pushing the RESET key will cause the computer to act as if the "RUN" instruction had been entered.

Here are two examples of program segments which load the correct entry points into the RESET vector. The first program is for Integer BASIC, the second for Applesoft; the lines should be among the first statements executed.

Integer BASIC

```
CALL 1002 : REM LETS DOS RESET I/O HOOKS
10 IF PEEK (1012) 74 THEN GOTO 100 :
REM CHECKS TO SEE IF CORRECT VECTOR LOADED
20 POKE 1010,236 : REM $3F2 GETS $EC
30 POKE 1011,239 : REM $3F3 GETS $EF
40 POKE 1012,74 : REM $3F4 GETS $4A
100 (Continue with program...)
```

The Integer BASIC program changes the RESET vector to point to location EC, which is used as the entry point for the RUN command. Note that locations 1010,1011, and 1012 in decimal are the same as \$3F2 to \$3F4 in hexadeciml. Also note that the number EC is in fact entered "backwards," with the least significant byte, , going first.

Applesoft BASIC

```
5 IF PEEK (758) 32 THEN GOTO 20 :
REM RELOAD INPUT BUFFER IF OVERWRITTEN
10 CALL 1002 : REM LETS DOS RESET I/O HOOKS
15 IF PEEK (1012) 167 THEN GOTO 100 :
REM JUMP IF RESET VECTOR IS OK
20 POKE 758,32 : REM $2F6 GETS $20
25 POKE 759,101 : REM $2F7 GETS $65
30 POKE 760,214 : REM $2F8 GETS $D6
35 POKE 761,133 : REM $2F9 GETS $85
40 POKE 762,51 : REM $2FA GETS $33
45 POKE 763,133 : REM $2FB GETS $85
50 POKE 764,216 : REM $2FC GETS $D8
55 POKE 765,76 : REM $2FD GETS $4C
60 POKE 766,210 : REM $2FE GETS $D2
65 POKE 767,215 : REM $2FF GETS $D7
70 POKE 1010,246 : REM $3F2 GETS $F6
75 POKE 1011,2 : REM $3F3 GETS $02
80 POKE 1012,167 : REM $3F4 GETS $A7
100 (continue with program...)
```

The Applesoft program points the RESET vector to location \$2F6, known in decimal as 758. What we just did in Lines 20-365 was to POKE into the computer a short machine language subroutine starting at \$2F6/758. That subroutine needs to be executed before jumping to the RUN statement entry point. It looks like this in Assembly format:

```
$2F6: JSR $D665 ;clear
$2F9: STA $33 ;Insures Applesoft RUN detect
$2FB: STA $D8 ;reset Applesoft ONERR flag
$3CD: JMP $D7D2 ;get next statement
```

In both programs the CALL 1002 is required, so that DOS can reset the I/O (input/output) hooks with its own pointers. After the RESET key is pressed, a reset subroutine is executed which sets the I/O registers to point to the keyboard and monitor. DOS is disconnected from these registers and all disk commands will be ignored until DOS reconnects itself by placing the pointers to DOS in the I/O registers. That's what CALL 1002 does.

In the Applesoft program, the Assembly language subroutine has been stuffed into the end of the keyboard buffer (locations \$2F6 - \$2FF). Since Applesoft only recognizes the first 239 characters that are input, (see Applesoft Reference Manual, bottoms of pp. 35, 38) the last 17 bytes of the buffer are ignored.

CAUTION: Although these last 17 bytes are not used by Applesoft, if more than 239 characters are entered on a line, these last bytes will be clobbered. This means that the Assembly language procedure that we loaded into the end of the buffer will be overwritten if any line has more than 245 characters typed into it. If the RESET key were to be used after such an overwriting, the program would bomb, and maybe lock up your system. That's why Line 5 checks for the value 32 in memory location 758; to see if the subroutine is there. If it isn't, then it gets loaded back in.

If having the subroutine located in the keyboard buffer presents a problem, the routine can be relocated to any other available place. Of course, Lines 1010 to 1012 must be altered to point to that new location. For example, if you were to locate the subroutine at \$3C6-\$3CF (next to the DOS reserved memory \$3D0-\$3FF), then the following lines would change:

5 IF PEEK (966)	32 GOTO 20
15 IF PEEK (1012)	166 GOTO 100
20 POKE 966,32	
25 POKE 967,101	
.	
.	
.	
65 POKE 975,215	
70 POKE 1010,198	
75 POKE 1011,3	
80 POKE 1012,166	

And that's how the RESET key can be used to RUN a program. It's also a good first look into the Apple's internals; try it.

Peter Baum joined Apple Computer, Inc. after graduating from the University of California (Berkeley) in June 1980 with a B. S. in E.E.C.S. His first assignment was Project Leader for the IEEE-488 interface card, about which he has published some papers. He also teaches a class called "Introduction to Home Computers." Mr. Baum is active in sports, and also reports that he is working on a truly humanitarian project: a computer to help pull weeds.

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Boston the APPLEFEST and the I A C

Neil D. Lipson and Joe Budge



Beneath Boston's Prudential Building, fifty-four stories high, the anxious crowd milled about waiting for the gates of Hynes Auditorium to open. At the stroke of 11:30 AM, they opened, admitting more than 20,000 of the faithful, the intrigued, and the curious into the season's first all-Apple computer show, Applefest '82. It was a show at which Apple users could study, ask questions, have fun, and learn much.

Within moments, the aisles were crowded as hundreds flocked to the booths of manufacturers, dealers, and publishers. Companies large and small were at the show, from mighty Apple Computer, Inc. itself to small hardware and software companies that had not yet outgrown their garages.

The tone of the Show was set by Steve Jobs, in his second-day address: "The amount of people that the garage (*i.e., Mr. Jobs' garage, wherein Apple Computers were born*) has spawned is really incredible. The professionalism of the booths and exhibits is amazing. This industry has really grown up."

Because of the excellent work by Gerald Milden, President of Northeast Expositions, the Boston Computer Society, and others, the Boston Applefest approached a level of professionalism previously seen only at shows like the "big" ones; CES, NCC, etc. (*And we should point out that this welcome trend was also apparent at the 7th West Coast Faire, covered in our May - June issue. —PCW*).

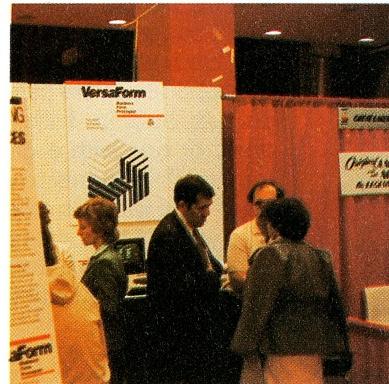
There were not a lot of new announcements since the West Coast Faire, but there were some interesting developments that deserve mention. First, it was a pleasure to go to a city that was totally dominated by the Apple computers. Just wearing your Apple pin in downtown Boston, three miles from the Fest, would bring comments from total strangers, such as . . . "Did you see what printers were selling for at the Show?", or, "How did you like the Xebec drive?", etc. Everyone in the Hub City, it seemed, knew the Apple.

Apple Computer, Inc., was out in force; their booth constantly held half a dozen or more blue-blazerred representatives, while more than a hundred Apple II's and ///'s were put through their paces at booths and in the special "hands-on" rooms which

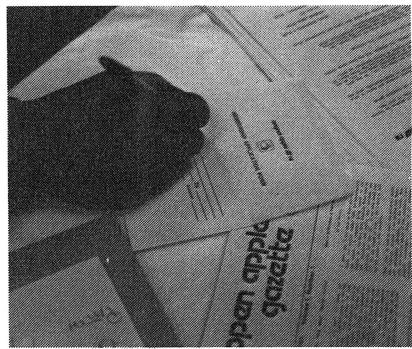
the company provided for the Fest attendees.

Other hardware vendors exhibited boards to make the Apple run faster, boards to make the Apple think it's something else (like an IBM), boards to run light pens, printers, hard and soft disks, plotters, etc., and a host of peripherals to connect to the boards.

Software vendors displayed their wares from booths as slick as science fiction, as slick, even, as the latest generation of software. Books? By the hundreds, with titles on every aspect of computing, particularly Apple computing. There were even stockbrokers at the Fest, with one holding a drawing for 50 shares of Apple Stock!.



Like diamonds in the rough, a few of the smaller less polished exhibits outshone many of their puissant brethren. The University of Illinois presented their automaton for solving Rubik's Cube. With a quaint charm, the Rube Goldberg contraption connected to a beige box rattled, hissed, clanked and groaned through to a solution, every time. Gibson Labs



displayed a new light pen and software package to simplify its use and to interface with user programs. Crowds gathered at these and other booths, despite the absence of expensive display layouts.

Outside Hynes Auditorium, the 10-story Apple hot air balloon dominated the scene; it was a spectacular sight. While it was closely tethered due to stiff winds on Boylston Street, short hops were available to the lucky and daring. Leading Edge Products brought two live elephants to the show to advertise their Elephant Disks. Like the product, the elephants excelled at going in circles. Neil Lipson's wife commented that it was a shame to leave the elephants in the 'elephant truck' overnight, but Neil mentioned that most of the local hotels were full, and could probably not accommodate them.

(Note: After that, Neil was "banished" to prepare a solo report on the Fest, while Joe concentrated on the IAC happenings. Neil picks up our story here:)

The Products

It was apparent that no one will be able to complain about a lack of variety in business and educational software. The large number of educators present was surprising until one realized that the Boston area

contains many many institutions of learning. Educational software in particular was at the Fest in abundance.

The only non-Apple computer present was the Basis 108 from Germany (see box), on display at the High Technology Software Products booth. It is rumored that the only two units in America (they're awaiting FCC clearance) were both at the show. There were quite a few people around them, but many did not know that they even existed.

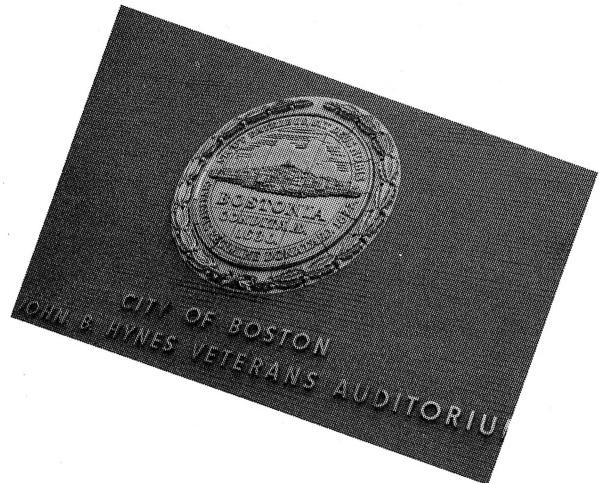
The Basis 108 has both 6502 and Z-80 chips, and is Apple compatible. I played with the unit for a short while, but I personally wished that the computer would be something different than what I saw. The keyboard was very flat, to meet the European health and safety requirements, and it was not set up like the Apple. It did not seem to have the 'feel' that the Apple keyboards have. There were some strange lines on the CRT that I could not figure out (possibly a hardware problem with that machine). These were European units, so I would expect some changes in the units produced for the American market.

Many people wondered about the Z-80 compatibility with a true Microsoft card software product. In addition, while there are parallel and serial outputs built in, I like the buffered ones, or one with a graphics dump routine. To be honest, I didn't spend a lot of time with the machine, but I'm sure you will hear a lot about it in the future. Time will tell whether it can match Apple's quality and versatility.

Datamost was there with five excellent products, most of them games, like Snack Attack by Dan Illowsky. Datamost is a new company founded by the legendary Dave Gordon. The company has had fantastic growth due to excellent management of Dave by Arlene Gordon; I would watch this company as a real mover in the future.

The new buffered printer cards and accessories made more news. The Quadram buffer was designed to go between any computer and any printer, so when you change printers (who's going to change their Apple?) you can use the existing buffer device, called the 'Microfazer'. Practical Peripherals also demonstrated their buffered card, with similar characteristics. These cards, as was also demonstrated at the West Coast Computer Faire, can hold as much as 64K of printing (at least 45 minutes).

SSM demonstrated their new AAO-II serial and parallel interface. This card has a bonanza of interfaces on one card. First is the Centronics compatible parallel printer interface. Next is the general purpose parallel interface. The third is the serial/terminal printer interface and last but not least is the modem interface. It appears that this one card can handle two printers at the same time with other functions as well. The price was \$225 retail, which makes it quite a bargain.



In speaking to Val Golding of A. P. P. L. E., I was told that the new Program Global Line Editor has all of the features of the old PLE, and in addition has global line edit, global search and replace, type ahead buffer, 1280 bytes of nestable macros and 80 column card compatibility. It loads in regular RAM or the language card.

Crow Ridge Associates in New Scotland, New York announced their APPLE FLASHER. This is a package that locates and displays standard Hi-Res graphic files from DOS 3.3. It bypasses ordinary DOS routines and displays the pictures in about 1.5 seconds each. This is the latest venture from Paul Mosher, M. D. since the Graphics Printing System demonstrated in my article "Make the Devil Do It!" (**APPLE ORCHARD**, May-June 1982, p. 16.)

One interesting drive at the Fest was the Rana drive from Rana Systems. The Elite One is DOS 3.3, Pascal, and CP/M compatible. It automatically boots 3.2 or 3.3 and can handle 163K in its normal mode. The price is about the same as a standard Apple drive.

A new fan that has two receptacles, and line surge suppression was shown from Kensington Microware in New York, NY. It retails for \$89.95 and is very similar...in fact, suspiciously similar to the R. H. Fan in appearance. There could be some problems there, involving legalities of use of the design.

One non-Apple related product that probably sold more at the Applefest than anything else were the metal business cards, nameplates, paperweights, or whatever, made from your regular business card. That booth seemed to do more business than almost anyone else.

Discounts were nothing short of phenomenal. For example the Epson MX-80 without Graphtrax went for as low as \$370. Especially on the last day when the dealers wanted to dump as much as they could to eliminate hauling it back home, prices dropped to rock bottom. It seems prices continually drop in this field.

Games

There were too many games in-

troduced to mention them all here but Sirius Software had about a sizeable amount of them. They demonstrated Dark Forest, Minotaur, Snake Byte and Habul Spy to name a few. Many of the old games were there with some of them, such as Norad, shown on a large projection TV.

Other games and new scenarios were present; Sir-Tech's famous *Wizardry* has a new scenario, wherein you fight the evil Davalpus. It appears that the game sophistication and graphics have improved again. This is hard to believe, but there seems to be no end to the improvement in the state of the art of graphics and ingenuity.

Conclusion

In my opinion, the show was phenomenal. It took me the better part of three days to see the areas that I wanted to see, and it was a truly professional show. I expect future Applefests will be done in this manner, and look forward to better products and software in the future as well.



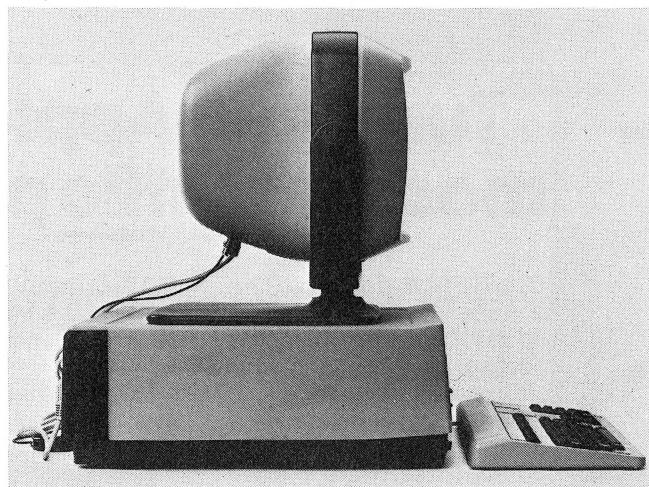
Das Numberkruncher . . .

Since the Basis computer attracted considerable attention at the Boston Applefest, we ventured into the lovely Santa Cruz Mountains to get the story behind this German import. Jim Young, the company's U. S. manager, opened the door, and showed us the unit.

As advertised, the machine, Basis Model 108, has on its motherboard both 6502 and Z-80 microprocessor chips, and 128K RAM, bank switched. A choice of 40-column or 80-column screen display is built in as well. Color is RGB. Six peripheral slots, numbered "2" through "7", will accept boards made for the Apple; serial and parallel I/O ports are built in.

This is a sizeable unit, made with the expected Teutonic sturdiness. It has an aluminum case, large enough to accept two 5 1/4" or 8" disk drives, or even a floppy and a 5 1/4" hard disk. No drives come with the unit; a variety is available. If Apple drives are used, DOS 3.3 will boot up quite handily. (Remember, the DOS comes with the drives, not the computer.) CP/M and Pascal systems are equally at home, as are other operating systems.

The separate keyboard is a bit strange to American eyes, because of European requirements. It has, however, enough keys to keep anybody occupied; 8 arrow keys and HOME; 15 definable function keys, and the numeric keypad on the right.



Model 108 is actually a little brother to Basis' other computers, Models 208 and 216. The company, in Munster, Germany, began by distributing U. S.-made computers, and then developing what it considered to be advanced designs when the U. S. companies proved to be less than fully capable of meeting West German needs for service support and in "other areas".

At press time, the first shipment of Basis computers for the United States was (a) sold out; and (b) awaiting completion of the FCC acceptance paperwork. We expect to see more of this unit in the future; one dealer was quoted as saying, "This market is starting to get interesting".



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President's Message

Ken Silverman
President, International Apple Core

Since its inception, the International Apple Core has published a series of technical bulletins called ApNotes, for member clubs. While these documents filled a need in their time, we have been concerned about their continuing adequacy in today's expanding Apple universe.

As an advertisement elsewhere in this magazine indicates, Apple Computer, Inc. and the IAC have found a better way of putting together a more comprehensive collection of technical information. The new service is called **Apple Tech Notes**. The initial issue, more than 450 pages in a segmented binder, will be out this Summer, and periodic updates will be issued on a quarterly basis. Unlike the ApNotes, these will be readily available directly to individual Apple owners, as the IAC will be distributing them through the Apple dealer network.

Each of the IAC's Full Member clubs will receive a free copy of the Apple Tech Notes, along with coupons good for a \$7.50 discount from the \$64.95 suggested retail price. The coupons are for those club members who want their own set and binder, and will be redeemable at the dealer's at time of purchase. Updates will continue to be mailed to those Clubs in good standing.

This is a major undertaking for the IAC; the **Apple Tech Notes** package is expected to be the primary reference source for Apple technical information, directly from Apple Computer, Inc. We're excited about this comprehensive treasure trove of technical resources being made available.

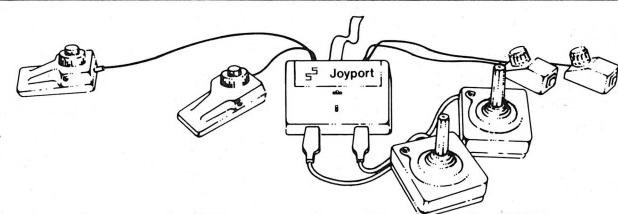
Why not ask your dealer when he'll be getting his first shipment?

On another subject, the IAC Board of Directors appointed two Vice-Presidents for the coming year: Harlan Felt and Lou Milrad. Lou's appointment is significant because he has begun to attack what I have considered to be a serious weakness in the IAC's spectrum of activities: the Special Interest Groups. Quite frankly, some of these have not been as active as they might have been, but the great potential for contribution to our accumulated store of knowledge as Apple users is still there. Lou is putting together the program, and I expect we'll see some new faces becoming part of the effort. If you have suggestions or assistance (preferably assistance), contact Lou. His telephone number, like all of ours, is on the masthead page of this magazine.

It should be a great and active year!

JOYPORT

Where Apple Meets Atari For A Good Time



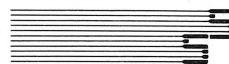
The Sirius Joyport is the most significant input device for the Apple computer since the keyboard. Features include:

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This roster of member clubs is directed primarily at APPLE ORCHARD readers who either currently don't belong to any Club, or who are looking for additional sources of information. The roster is arranged alphabetically by country and state or province. In addition, some clubs have a membership, publication and/or software services which go beyond local geographic boundaries. Readers may wish to contact these Clubs and request a sample newsletter. If you do, we recommend enclosing a check for two U. S. dollars to cover their postage and handling costs.

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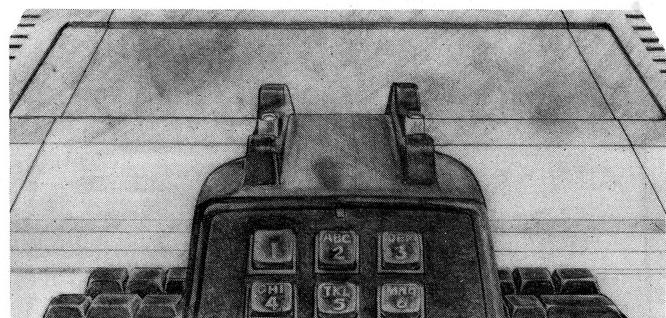
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Gosub to variable		

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IAC ANNUAL MEETING

The Second Annual Meeting of the Full Member clubs of the International Apple Core was held on Saturday, May 15, 1982 in Hynes Auditorium, Boston.

As of the record date, May 3, the IAC had 257 Full Member Clubs. Of these, thirty-two were personally represented at the meeting, while another eighty-four were represented by proxy.

The meeting began with the reading of the minutes of the First Annual Meeting, and an interim Treasurer's Report. A full, audited Treasurer's Report will be sent to the Member Clubs in October, as required by law. Both the minutes and Treasurer's report were unanimously accepted.

The results of the elections for Directors were announced. The following were recognized as newly elected Directors for their regions:

Stephen Lloyd - West
Bob Sander-Cederlof - South
Barry Bayer - North
Robert Ramsdell - East
Auby Mandell - Canada
Roger Keating - Australia

No nomination had been received for Director - Europe. Therefore, according to the By-Laws, Wolfgang Dederichs will continue to serve until the election process can be repeated in that region.

Finally, the By-Laws were amended to move the official Corporate office from San Mateo County to Santa Clara County, CA. This move corresponds with the establishment of a full-

time office and staff for the IAC in Santa Clara. The amendment passed by a 115-1 vote.

Following the formal business portion of the meeting, open discussion was held on a number of topics; these will be considered in **Apple Orchard** during the year.

At the Directors' Meeting, held Saturday afternoon, the Directors selected the following officers for the IAC for 1982-83:

President : Ken Silverman
Vice President : Harlan Felt
Vice President : Louis Milrad
Treasurer : David Alpert
Secretary : Joseph Budge

Respectfully submitted,
Joseph Budge
Secretary

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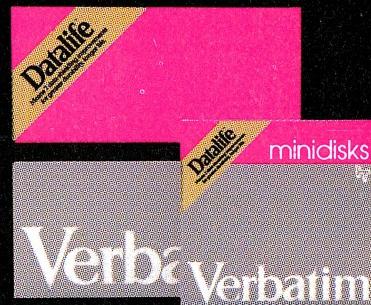
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Replacing INPUT with the “&”

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with Val J. Golding

(from *Call A.P.P.L.E. in Depth #1*)

Here is yet another version of the famous (or infamous) Input Almost Anything Subroutine. Going back to what in Apple terms is ancient history, this was written by John Crossley of Apple Computer, Inc., published and republished, misattributed to Jim Hoyt (Mr. Crossley's boss), and therefore sometimes known as the "Hoyt Input Routine."

The problem which this routine attacks is that Applesoft will not accept commas and certain other characters as part of an INPUT statement, because these characters send an automatic "that's all folks" message to the program. You

```
1 LIST
0 REM
AMPERSAND INPUT * D A LINGWOOD
APPLE ORCHARD
1 HOME : INPUT "NAME OF FILE TO
    PRINT " ;FS
2 GOSUB 1000
5 D$ = CHR$ (13) + CHR$ (4): PRINT
    D$"OPEN"FS: PRINT D$" READ "
    FS
10 ONERR GOTO 200
20 POKE 1013,76: POKE 1014,0: POKE
    1015,3
30 A$ = ""
100 & A$
110 PRINT A$: GOTO 100
200 IF PEEK (222) < > 5 THEN PRINT
    "
ERR# "; PEEK (222): END
210 PRINT "
END OF FILE ON ";FS
220 END
1000 FOR I = 768 TO 794: READ J:
    POKE I,J: NEXT : RETURN
1010 DATA 32,227,223,162,0,32,11
    7,253,160,0,138,145,131,200,
    169,0,145,131,200,169,2,145,
    131,32,57,213,96
2000 REM
THIS SAMPLE PROGRAM WILL PRINT
TEXT FILES AT ABOUT 1400 BAUD
```

know this has happened when you get an ? EXTRA IGNORED error message. This was particularly frustrating when you tried to enter a date as "March 6, 1982"; in this case, only the "March 6" would be accepted as valid input, while the comma and year would be ignored with you receiving the notorious error message noted above.

Of course, there are a couple of easy "kluge" fixes for this. Here's one:

```
100 PRINT "ENTER MONTH, DATE AND YEAR: ";;
INPUT MD$,Y$
110 DATE$ MD$ ,"" Y$T1
```

This concatenation of strings works fine on INPUT, but causes problems when writing data to a disk. Y'see, the INPUT when reading out the data from the disk also falls apart at the comma; you find the EXTRA IGNORED all over again.

Another approach involves using Applesoft's GET routine for each character, one at a time, and concatenating the characters to form the input string. This works, but can be cumbersome in BASIC.

Enter John Crossley, who reasoned that by changing the string pointers of the INPUT string to point to the keyboard buffer and then moving the string to its final location, Applesoft's syntax checking routine could be bypassed altogether. This was done in the form of:

```
IN$ MID$(IN$,1)
```

...after having first defined the input string as the first variable, so its location would be known to the program.

Then, in the first issue of *Apple Orchard*, March-April 1981 (*Back copies of which are still available -PCW*), Mr. Crossley came up with a lead article on Applesoft internals that was to turn the Apple world topsy turvy in terms of new vistas: an entirely new area of assembly language programming using Applesoft ROM routines was opened up, and hand in hand with this was the concept of using the ampersand (&) command to pass parameters to the 6502 registers and Applesoft ROM routines.

From this, then, comes the Lingwood "& INPUT" subroutine, a direct replacement for the standard Applesoft INPUT. It will accept any character typed as part of the input stream or read back from a disk. It is presented as a BASIC program, in which the machine code appears in the form of DATA and READ statements. In addition, for those readers who wish to delve further, a commented Assembly listing is also provided.

The BASIC program listed here is set up in a form that allows any standard text file to be read into memory. Subroutine 1000 stuffs the machine code into memory at location \$300, and Line 20 establishes the ampersand jump to the same address. Line 30 defines A\$ as the "GET" string, and Line 100 calls the machine language. Line 110 prints the input to the screen, then goes back for more. Meanwhile, Line 10 sets up an error handling routine starting at Line 200, which checks for an OUT OF DATA error; if found, it terminates the program.

The short Assembly language subroutine uses PTRGET to read the variable name following the & in the BASIC program, then does a JSR to the monitor routine RDCHAR,

which gets a character from keyboard or disk. Next, a descriptor is created for the string, consisting of length and address. The address is set equal to the keyboard buffer, where RDCHAR has placed the data. Finally, GDBUFS adds a zero (which serves as a terminator) to the end of the string, masks off the high byte of each character so Applesoft will understand it, and then returns control to the BASIC program.

This little gem can be easily modified to suit just about any application, and thus should be considered as one of the most valuable additions you can make to your subroutine library. If you haven't started your subroutine library yet, now is the time. This Input Anything subroutine does anything GET can do, considerably faster, and without any of the problems and bugs inherent in GET.



Dave Lingwood is Secretary of A.P.P.L.E. in Seattle, and holds a Ph.D. in Communication Research. He was a reasonably normal social scientist before abandoning academe for his own company, Action-Research Northwest, which distributes word processing and statistical analysis software for the Apple II.

:ASM

```

2   ****
3   * & INPUT * CROSSLEY/LINGWOOD *
4   *
6   *
7   VARPNT    EQU    $83
8   PTRGET    EQU    $DFE3
9   RDCHAR    EQU    $FD75
10  GDBUFS    EQU    $D539
11  *
12          ORG    $0300
13  *
14          JSR    PTRGET      READ VBL NAME
15          LDX    #$00
16          JSR    RDCHAR      GET A CHARACTER
17          LDY    #$00
18          TXA
19  *
20  * Create descriptor
21  *
22          STA    (VARPNT),Y STRING LENGTH
23          INY
24          LDA    #$00
25          STA    (VARPNT),Y LO BYTE OF BUFFER
26          INY
27          LDA    #$02
28          STA    (VARPNT),Y HI BYTE OF BUFFER
29          JSR    GDBUFS      ADD 0 TO STRING, MASK MSB
30          RTS

0300: 20 E3 DF 14
0303: A2 00 15
0305: 20 75 FD 16
0308: A0 00 17
030A: 8A 18
030B: 91 83 22
030D: C8 23
030E: A9 00 24
0310: 91 83 25
0312: C8 26
0313: A9 02 27
0315: 91 83 28
0317: 20 39 D5 29
031A: 60 30

```

--END ASSEMBLY--

ERRORS: 0

27 BYTES

SYMBOL TABLE - ALPHABETICAL ORDER:

GDBUFS = \$D539	PTRGET = \$DFE3	RDCHAR = \$FD75	VARPNT = \$83
-----------------	-----------------	-----------------	---------------

SYMBOL TABLE - NUMERICAL ORDER:

VARPNT = \$83	GDBUFS = \$D539	PTRGET = \$DFE3	RDCHAR = \$FD75
---------------	-----------------	-----------------	-----------------

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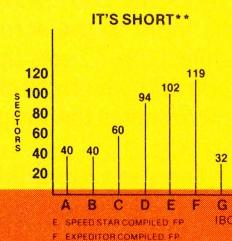
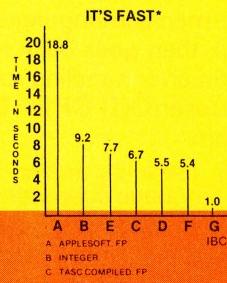
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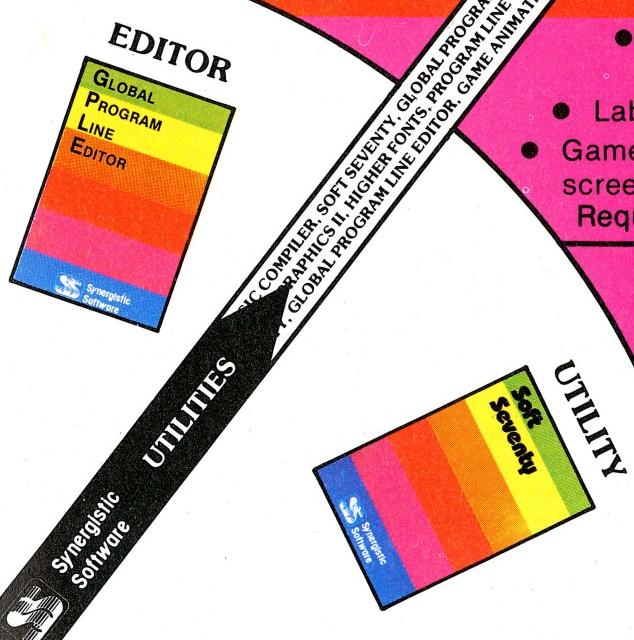
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VisiCalc TIPS AND TECHNIQUES

Joseph J. Sobel

with Barry D. Bayer

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Many articles have been written about VisiCalc and its creators, Dan Bricklin and Bob Frankston. None of these will ever be able to say enough about what VisiCalc has done for personal and business computing, so we won't attempt to do that either. Rather, the goal is to simplify and enhance your use of VisiCalc.

This series of articles has been organized into the following major segments:

- A. Basic tips and techniques
- B. Advanced techniques
- C. Printing your worksheets
- D. Software and hardware enhancements for VisiCalc use

Basic Techniques

As a long time user of VisiCalc I have been asked on many occasions to discuss its use for the Business Special Interest Group of the Northern Illinois Apple Users Group. At these presentations, I have found that most users of VisiCalc are not accounting oriented, nor do they have extensive computer backgrounds. Generally, these users are small businessmen who have purchased an Apple to assist them in their businesses. Therefore, the tips and techniques I'll discuss in these articles are designed to save the vast majority of users time in planning and preparing their worksheets.

An excellent source of information to assist you in creating worksheets and saving time in doing so is the VisiCalc documentation itself. The 'Command Reference' section, comprising the latter half of the VisiCalc 3.3 documentation, is an invaluable aid. Careful reading of this section can be a great memory jogger. When you are having a problem, looking at the Reference Card, the Index, the 'Command Reference Chart' and the appropriate portion of the 'Command Reference' can go a long way toward solving most problems with a minimum of wasted time and effort. Several of the techniques discussed below can be found in the VisiCalc documentation itself. Unfortunately, there are many things which are not adequately explained in the documentation, such as the use of the Boolean functions. However, there is still a wealth of information to be gleaned from the documentation.

In order to obtain maximum benefit from these articles, you should have a working knowledge of VisiCalc. Some of the more intricate techniques will be understood best by actually sitting at your computer and using them. You should periodically re-read the VisiCalc documentation and these articles. Undoubtedly, you will come across techniques and information which you missed or forgot since your first reading. This will be especially helpful in connection with features you have not needed for some time, or those which you may never have used at all.

Several techniques are important to all aspects of computer operation, and are especially important when working with VisiCalc. Disasters, such as power failure, computer malfunction, or unthinking clearing of a template have a habit of occurring at the most inopportune times. Therefore, heed these warnings carefully:

1. **Make it a habit to save your work often.** Doing so will minimize time wasted in reconstructing your work in the event of a disaster. You may save over the old file by typing the same file name as the previous file. If you are lazy, or you are a lousy typist as I am, you may cursor through the catalog (*Now there's an interesting verb: "to cursor". —PCW.*) with the right arrow key when prompted for a file name until the appropriate file name appears on the edit line. When you have found the file name you want, you may record over that file by pressing RETURN and then responding with a 'Y' to the question of replacing the old file. If you want to retain the old file, you may add a trailing character or number to the name on the edit line to identify the updated version. This will create a new file, while leaving the original intact. (If 'EXAMPLE' is your old file name, your revised file could become 'EXAMPLE. 1'.)
2. **Back up your data disks and keep them in a safe place.** Preferably in a place other than the one where you keep your originals. I'll have to remember and obey that one myself! You can also save the file twice, once to your original data disk, and then immediately save it again to a backup data disk.

3. **Make or purchase a backup of the program disk itself.** This is a small price to pay should your original fail at a crucial time. We all know that disks *only* fail at crucial times, and archive copies of a program are specifically permitted by federal copyright law. As long as we're on the subject, it's a good idea to remove your program disk from your disk drive as soon as VisiCalc is booted. You won't need it unless you want to reboot, and removal lessens the possibility of problems.
4. **Disable your RESET key** to avoid the necessity of saving your work and rebooting the system needlessly. On newer Apples, set the reset protect feature on the encoder board which is piggy-backed on the keyboard (see your Apple II Owner's manual). On older Apples, place something over the RESET key, use one of various methods suggested in numerous articles, or obtain one of several devices made for this purpose at your local computer store.
5. **If you have the 3.3 version of VisiCalc, check the version number.** The version number appears on the edit line when the program is first booted. As soon as a key is pressed, it will disappear. To display the version number again, press '/V' (without the quote marks of course). If you have version 193B0, you should obtain the updated Version, 202B0, from VisiCorp as soon as possible. In the meantime, don't try to save more than one or two DIF or Print to Disk files on one disk, since Version 193B0 contains a significant bug in the DIF function. This bug can cause the Volume Table Of Contents (VTOC) and/or some of the directory sectors to be overwritten or destroyed. DOS uses the VTOC and the directory to locate files on the diskette, and the destruction of one or more of these sectors could render your files unusable unless you or a friend has a working knowledge of DOS and you are able to repair the damaged disk. If you are still using the 13 sector 1.37 version of Visicalc, you should seriously consider upgrading to the more powerful 16 sector version which contains enhancements such as IF/THEN/ELSE logic, and gives you more room for data on your disks.

Worksheet Planning Ahead.

Now let's begin the actual planning of a worksheet. The following techniques may initially require additional time. However, they will save you much more time in the long run than you will spend in the planning stage:

1. **Begin planning your worksheet on paper** before you start to work on the screen. Yes, it may have said something stupid like that somewhere in the documentation. But it really works. **Avoid the temptation to just start entering data.** I'll admit that I have trouble doing that myself, but this will pay off tenfold later.
2. **Always work from the upper left of the worksheet to the lower right**, continuing down the sheet, and staying within the rectangle formed by your work as much as possible. This will conserve memory and generally will result in a more efficient worksheet.
3. **The worksheet should contain a 'Data' area and a 'Report' area.** Data to be input by the user, variables to

be used in calculations, intermediate calculations and tables, which will not be displayed in the final report, should be kept in the 'Data' portion of the template. The 'Report' area will consist of the actual format to be used in a formal presentation. Alternately, it may merely be a section near the bottom of the worksheet used to summarize the resulting calculations in a form suitable for presentation purposes.

*** DATA AREA ***				

COST OF GOODS SOLD AT VARYING				
LEVELS OF SALES				

COGS/SALES<180000	.5	*	*	*
COGS/SALES>180000	.45	*	*	*
COGS/SALES>250000	.42	*	*	*
COGS/SALES>280000	.41	*	*	*

PERIOD	1	2	3	4
SALES	100000	110000	121000	133100
COSTS	50000	55000	60500	66550
GROSS	50000	55000	60500	66550
				146410
				73205

Figure 1. Data and Report Areas.

As much of your data as possible should be expressed and entered as 'variables', with formulas using references to the Cells containing the variables. These data entries should be entered in the upper left portion of the sheet, across the top of the template or down the left side. This will facilitate recalculation of the sheet since data will be available as other locations on the worksheet are being calculated. These single entry 'variables' give you the ability to play 'What If' games with your worksheet by allowing you to change the variables or assumptions in only one place. All of the related figures on the template can then be recalculated. Remember, when the worksheet is printed, only the 'Report' portion of the sheet needs to be printed for your formal presentation.

Worksheet Construction

Now we're ready to sit down at the computer and begin to construct our worksheet.

As soon as VisiCalc is loaded and ready for use, four Global commands — /GF, /GC, /GR, and /GR — should be entered immediately:

- A. Set the Global format, if it is to be other than 'General', using the /GF command followed by the appropriate format symbol; \$, I)nteger, etc. Give careful thought to selecting the Global format to be used for the largest number of individual Cells. This will minimize the local formats which you will have to set for individual Cells to be displayed in a format other than the Global format of the sheet and will conserve memory which would be used by the local format commands contained within each 'non - Global' cell. It will also simplify data entry. For example, let's assume that you want a Column of numbers displayed to at least five decimal places, but most other Columns are to be displayed as dollars and cents. In such an example, the Global format should be set to /GF\$, and the Cells in the Column to be displayed

with more than two decimal places should be set individually, by Replication of course, to /FG.

- B. Column width should be set to the desired number of characters with the /GC command followed by the appropriate number. Remember to allow a character for the '+' or '-' sign and a decimal point, if applicable. Allow enough characters for the largest total or numeric display you expect to have on the worksheet. Keep in mind that totals may contain several more digits than the data which is being totaled. Proper planning at this time will save you a great deal of time later. Changing the Column widths after the data has been entered may require retying all of your labels. At a minimum it would require the use of a program such as Context Connector, (which will be discussed under Advanced Techniques), to reformat your labels. You must also consider your printing requirements in terms of the number of Columns you can print on a page at the desired Column widths, and the appearance of your sheet if data is cramped or spread out too much.

- C. Recalculation should be set to 'Manual' with the /GRM command. This will save recalculation time when entering data in each Cell. When the program is in the automatic recalculation mode, the worksheet is recalculated *each time* the RETURN key is pressed. You can recalculate at any time while you are in the Manual mode by pressing the ! (SHIFT and 1) key. (You can change the Template back to automatic recalculation with the /GRA command.)

- D. Set the Order of Recalculation to recalculate by Rows or Columns as appropriate with the /GOR command to calculate by Row, or the default /GOC to calculate by Column. The Order of Recalculation is shown in the upper right corner of the screen, above the remaining memory indication, as an 'R' or 'C'. The order to be used will depend upon your particular application. If you notice that it takes several recalculations to obtain the proper results, the Order of Recalculation may need to be changed.

MORTGAGE AMORTIZATION SCHEDULE

*** DATA INPUT AREA ***

BUYER:

SELLER:

PROPERTY:

AMOUNT OF LOAN \$ 70000

INTEREST RATE .11

NUMBER OF PAYMENTS PER YEAR 12

TERM IN YEARS 30

*** CALCULATED DATA *****

PERIODIC PAYMENT \$ 666.63

ANNUAL PAYMENTS \$ 7999.56

PERIODIC INTEREST RATE .0091667

NUMBER OF PAYMENTS 360

MONTHLY PAYMENT

PERIOD	BEGINNG BALANCE	INTEREST	PRINCPL	ENDING BALANCE
1	70000.00	641.67	24.96	69975.04
2	69975.04	641.44	25.19	69949.85
3	69949.85	641.21	25.42	69924.43
4	69924.43	640.97	25.66	69898.77

Figure 2. Mortgage Amortization.

Note separate Data and Report areas.

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A good example of a sheet which would require calculation by Row is a loan amortization schedule, where each Row contains the data relative to a periodic payment, e.g. beginning balance, interest, principal and ending balance. In such an example, the last item in the Row is required for proper calculation of the items in the next Row, and this last item is dependent upon the proper sequential calculation of the other items in its Row.

Try this using Columnar recalculation in such a worksheet. You'll find that it takes numerous calculations to obtain the proper results when calculating multiple repayment periods.

- E. Set your local formats for individual Cells as you enter a value, and certainly before you replicate a formula. Once you have made an entry into a Cell, *you cannot replicate just the Cell format* into each desired series of filled Cells without also replicating the data (or blank status) contained in the 'source' Cell as well. An alternative is to type the format command at each desired Cell location; this is obviously not the best alternative.

The format command, when contained in an otherwise blank Cell, can itself be replicated to other blank Cells. Once entries have been made in particular Cells, local format commands may only be entered by typing them at each and every Cell location you wish to change; or by creating an 'overlay' template containing only the format commands, and overlaying this "sheet" onto the template containing the data.

You can also perform some minor miracles with 'Print to Disk' files in order to reformat Cells. However, all of these alternatives involve additional work, and in some cases they require the purchase of additional software. Methods of overlaying templates and printing files to disk will be explained further under Advanced Techniques.

Planning complex worksheets may be simplified by typing letters on Row 1 in all of the Columns expected to be used. These alpha characters should correspond with the VisiCalc Column letters contained in the inverse border across the top of the VisiCalc screen. Similarly, the Row numbers should be entered in Column A on each Row expected to be used. Row number entry may be simplified by entering the first Row number with a value and generating the remaining Row numbers with a formula. Remember, there is already an 'A' entered in Cell A1. Therefore, a '2' should be entered in Cell A2, then the formula '1 + A2' should be entered in cell A3. This formula may then be replicated as far down the worksheet as necessary.

```
> A2 : 2
> A3 : (A2 + 1)
> A3 : /R : A4 . A10 : R
```

A 'blank' worksheet with these borders may then be printed and used for further planning purposes. This provides a way to determine the appropriate Coordinates to be placed in formulas as they are entered into the worksheet. Figure 3 shows how the template would appear on the VisiCalc screen:

	A	B	C	D	E
1:	A	B	C	D	E
2:	2				
3:	3				
4:	4				

Figure 3. Row/Column "frame"

Once they have accomplished their purpose of helping you locate yourself during worksheet construction, these "borders" can be deleted, using the Delete Row (/DR) and Delete Column (/DC) commands if additional memory is required. You could also leave them on the worksheet and eliminate them when you print the completed worksheet. Do this by placing the cursor to mark the upper left corner of the portion of the sheet to be printed, at Cell B2 instead of Cell A1.

Build and maintain a 'Format' disk, to contain files of data such as 'blank' worksheets and other data frameworks which you use often. These can then be inserted into other worksheets without the normal duplication of effort in typing repetitive data. These 'formats' should be saved with the DIF (/S#S) function. (This will be further explained under Advanced Techniques; it's also in the VisiCalc manual). These formats may later be loaded at any location on a template merely by placing the VisiCalc cursor at the desired location. Data such as the Row numbers and Column letters discussed above are naturals for storage as the first file on such a format disk.

Two points on memory conservation should be mentioned here. First, remember that when you use the /B lank command the Cell contents are deleted. However, if there is a *local* format set for that Cell it will remain in effect, and Format commands in otherwise blank Cells still use up memory. To eliminate the Cell format you will have to set the Cell to the default format /FD, preferably by replicating a non formatted blank Cell into these locations. That will reclaim some memory. Large areas of a worksheet may be 'blanked' by replicating a blank Cell down a Column as far as necessary. Then that group of blank Cells in the Column (Source Range) may be replicated across the sheet into as many Columns as required.

Second, remember that in some cases, VisiCalc will not reclaim memory on a worksheet when you have deleted a major portion of the sheet. You may find, after deleting some unnecessary data to make room for new data, that you have not reclaimed any memory. In such instances, you should save the file (/SS), clear the worksheet (/CY), and then reload (/SL) the file. Generally, you'll find that you now have additional memory.

Titles

Titles in Column headings, and descriptions on Rows, may now be typed in their appropriate places. These may be locked in place while entering the remaining data, variables and formulas in order to facilitate data entry at the proper Coordinates. This is accomplished with the title locking commands, /TH (Titles Horizontal); /TV (Titles Vertical); and /TB (Titles Both Horizontal and Vertical). The

title and Column headings for the report section can be typed in and locked into place for construction of the report and related data entry. When you're ready to construct the Report portion of the template, the Data headings should be 'unlocked' with a Titles None Command (/TN).

Figure 4a shows how the data entry portion of the worksheet may appear on your screen as you are first entering it, while Figure 4b shows how the screen would appear after you entered periods 1 and 2 and moved them to the left, bringing Columns 3 and 4 into view. Notice that Rows 1 through 4, which are not crucial to data entry have also been moved out of the window.

A	B	C	D

*** DATA ENTRY ***			
3 OPERATING RATIO ASSUMPTIONS (% OF			
4			
5		PERIOD 1	PERIOD 2
6		-----	-----
7 PAYROLL	.33	.32	
8 PAYROLL TAXES	.02	.02	
9 OTHER FRNG BNFTS	.04	.03	
10 ADVERTISING	.02	.02	
11 AUTO EXPENSES	.01	.01	
12			

14			

Figure 4a: First entry; titles locked.

A	B	E	F

5 PERIOD 3 PERIOD 4			
6 -----			
7 PAYROLL	.32	.33	
8 PAYROLL TAXES	.02	.02	
9 OTHER FRNG BNFTS	.04	.04	
10 ADVERTISING	.02	.02	
11 AUTO EXPENSES	.01	.02	
12			

14			

Figure 4b: Next entries; columns moved.

When preparing your template, you should first enter Column and Row descriptions and formulas. Actual numerical ('hard') data should not be entered yet. Then, save the template on disk. Including the word 'BLANK' in the file name will be helpful later when you wish to use the sheet again, because it avoids the need to reconstruct a template from scratch each time you have a new set of facts requiring the same computations.

You then input data on the blank template for this period's report or this particular set of facts and assumptions. For the next period, just load the BLANK worksheet, and enter only the new 'hard' data.

In some instances, especially those where you no longer need the previous data, it may be advantageous to reload the previous template and begin the current template by modifying the old data. The results may then be saved under a new file name. Each time you revise a worksheet, you should update the 'BLANK' template as well. Remember to re-review the revised template to be sure you haven't made any errors in setting up the formulas or that you haven't forgotten to correct any portions of the template which are dependent upon the revisions.

Replicationationationation

When replicating a source range consisting of more than one Cell, to a target range of the same size and in the same direction (Row to Row or Column to Column), specify only the beginning Coordinate of the target range! If the entire target range is specified, the recursive nature of the Replication process will give you unwanted results in the form of a "runaway" replication beyond the specified target range. This will wipe out data in Coordinate locations which were not intended to be changed. For example,

/R A2...A10:A22 RETURN

should be used rather than

/R A2...A10:A22...A30 RETURN.

Try it both ways and compare the results.

Formatting

The presentation of your worksheets may be enhanced by the manner in which they are formatted. Figure 5a shows a perfectly good template which is, unfortunately, just a bit hard to read.

PERIOD	1	2	3	4	5
SALES	100000	110000	121000	133100	146410
COSTS	50000	55000	60500	66550	73205
GROSS	50000	55000	60500	66550	73205

Figure 5a: Unadorned template.

So let's put in some repeating labels (using the /-repeating label command followed by '-') to set off the period numbers, and to show totals.

PERIOD	1	2	3	4	5
-	-	-	-	-	-
SALES	100000	110000	121000	133100	146410
COSTS	50000	55000	60500	66550	73205
GROSS	50000	55000	60500	66550	73205

Figure 5b. Format lines.

However, a more professional appearance may be given to your reports by leaving a leading space as the first character in each underline or double underline. Do this by using the 'Label' command (") followed by hitting the space bar once, and then hitting the - or = key as many times as necessary to fill the Cell. You may also enhance the appearance of the report by the spacing of column headings.

PERIOD	1	2	3	4	5
Sales	100000	110000	121000	133100	146410
Costs	50000	55000	60500	66550	73205
Gross	50000	55000	60500	66550	73205

Figure 6: Format Enhancements.

You know that the " character tells VisiCalc that the entry is to be a label. But to save keystrokes and time, an alpha key, preferably 'Q', which is next to the ESCAPE key, may be

pressed instead, to set the Label format. Then, delete the alpha character by hitting **ESCAPE** (which is next to the **Q**). I have found this to be much quicker than using the **SHIFT** and **2** keys to obtain the ' ' to designate the label format. Now, hit the space key and then the **-** or the **=** key as many times as necessary to fill the rest of the Column. There will now be a visible space between each Column.

Also note that the repeating label may contain characters other than **-** or **=**, e.g. *****, **#**, etc. There are times you may want to use such "decorative" repeating labels to separate portions of your worksheet or to set off or enclose data areas or instructions. In addition, the label may contain a combination of characters such as **!*!*!*** or a word. Just use the repeating label command followed by the series of characters you wish to use, e.g. ***!** as in the example above. The single series will be repeated through the entire Cell.

Be forewarned, though, that repeating labels saved with the **DIF** function will not function as repeating labels when reloaded. Instead you will only see the first character(s) which you designated as the label, e.g. **=** or ***!**.

Worksheet Review

Once you have completed worksheet construction, it should be reviewed in detail, preferably by printing a worksheet with sample test data on your printer. You should then print the Coordinate Formulas as described in the VisiCalc manual (**/SS, S1** where 1 is the slot number of the printer).

If you used the technique described above of labeling the Rows and Columns to correspond to the VisiCalc Row and Column designations, your job will now be quite a bit easier. If you have not, then you should now label all or most of the Columns and Rows on your printout by hand. This will allow you to relate the formulas on the Coordinate Formula printout to the specific locations on your worksheet, thereby

providing a means of verifying the accuracy of the computations to be made by the template.

Since the Coordinate Formula printout is laid out rather awkwardly, you may also wish to make notations to the right of each Row to describe how the Row is calculated. In some instances it may be helpful to make notations at specific Coordinate (Cell) locations on the printed worksheet where complex calculations are involved, in order to understand the functions being performed. The printed worksheet should be reviewed for reasonableness to be sure it performed properly with your test data.

With the manual, using the program and reading the techniques discussed here, I hope that you find it easier to plan and construct your worksheets with less effort. All the excess time you will have on your hands (Hal) may now be used to develop and translate more of your ideas into useful applications. In future articles, we will cover the remaining topics; Advanced Techniques, Printing, and Software and Hardware Enhancements.



Joseph J. Sobel is an Audit Partner with Laventhal and Horwath, an international public accounting firm, with offices throughout the world. Mr. Sobel uses VisiCalc extensively in connection with both audit and consulting engagements, including financial projections, feasibility studies, and numerous auditing and accounting applications. He is Treasurer of the Northern Illinois Apple Users Group.

Barry D. Bayer practices law with the Chicago firm of D'Ancona and Pflaum; his particular interest is real estate and computer-related matters. He is the author of a regular column on VisiCalc published in *Desktop Computing*, and has published material on VisiCalc and other topics in *Creative Computing*, *Personal Computing*, *InfoWorld*, and *Hardcore*. Mr. Bayer is a Director of the International Apple Core, representing the Northern United States.

The New VisiCalc?

We are indebted to Martin J. Farkas, a CPA with the Chicago firm of Bernstein and Bank, Ltd., for the following information presented by a representative of VisiCorp at the American Institute of Certified Public Accountants' meeting at Kansas City last month. Press time attempts at confirmation from Software Arts, Inc. failed to confirm or deny the information, other than to determine that a new VisiCalc is, indeed, coming.

The information we have is this: the new version of VisiCalc will be published within a few months. It will have many enhancements, will require more memory, and will require the program disk to be left in a disk drive when the program is running. Old templates will be usable with the new version.

Worksheet control features include protected fields, tabs, hidden fields, and the ability to check data input for proper type (labels, values, and numbers). VisiCalc will add a help message (using the question mark key), on-screen prompts will be available to assist the user in inputting data, and groups of "command sequences" may be chained together to automate a VisiCalc model.

New display and report format features include "center" and "gutters" for labels, variable column widths, floating dollar sign, per cent signs, commas, decimal point control, with negatives either in parentheses or debit/credit options. Color usage will be

available with standard hardware support. The template designer may include report titles, form lengths, margin widths, page breaks, page numbers, and page lengths and widths, automatically, to ease report printouts.

Calculation features include internal rate of return, future value, rate, periods and payments for normal mortgage amortization, and value types including month/day/year, minutes/seconds, and days of the week. New Boolean functions will include a **@LABEL** and **@LCHOOSE**. (We assume this means a VisiCalc formula will now be able to return a letter or name of something, rather than just a numerical value, obviously a big step forward.) A statistical package including sum of squares and weighted averages will be included.

The new VisiCalc will have the ability to consolidate data from other templates replicate attributes only, and will enable the user to move, insert or delete whole blocks of multiple rows or columns.

One assumes that the new VisiCalc will also have a new price tag, but we suspect that the new features will make the whole project worth while for many avid VisiCalc users. We'll provide further details, confirmations etc., as we are able to obtain them.

A VisiCalc Glossary . . .

The following short glossary of terms is provided to help you to understand the text and examples:

Argument: A mathematical expression, e. g., a number, variable or value resulting from a formula, which is used by a mathematical function in further calculations or in determining parameters. An argument in VisiCalc may be a number, a formula or a Cell reference. For example, the sum of the contents of Cells C4 through C9, expressed by the formula @SUM(C4...C9), contains the function @SUM and its arguments C4 and C9 which represent the range of Cells that the function is to operate upon. Examples include:

VISICALC FORMULA	BUILT IN FUNCTION	ARGUMENTS
@SUM(C4...C9)	@SUM	C4...C9
@IF(A1<0,0,A1)	@IF	A1<0,0,A1
@MIN(D4...D15)	@MIN	D4...D15
@LOOKUP(G15,B5...B10)	@LOOKUP	G15,B5...B10

Boolean: An expression, which evaluates to the logical value of True or False, i. e., it either equals or does not equal another value or condition to which it is compared. For example, $2 + 2$ or $5 * 7 = 35$. These evaluate as TRUE in "Boolean Logic", while $2 * 5 = 15$ is a Boolean expression which evaluates as FALSE. A1 = A2 may evaluate as either True or False depending on the values in these Cells. The values in a Boolean expression in a VisiCalc worksheet may be complex formulas and/or references to other Cells containing values or formulas. The built-in Boolean functions, such as @IF, @AND, @OR, and @CHOOSE are among the most powerful features of VisiCalc.

Cell: A location on a VisiCalc worksheet denoted by the Coordinates of an intersection of a Column and a Row, i. e., Cell B4 is the Cell located in **Column B on Row 4**. Cells, numbers or formulas may be entered directly into a VisiCalc Cell by merely typing them at the desired location. Labels, values and formulas may be entered in a Cell by moving the cursor to the desired Cell with the arrow keys or using the Go To Coordinate (>) function.

Coordinate: The identification of the intersection point of a Column and a Row on a VisiCalc worksheet. This may also be thought of as the 'name' of a Cell.

Data: Labels, formulas, or mathematical values to be entered into or computed by VisiCalc.

DIF: Data Interchange Format (/S#S and S#L) is a standardized data file format. The use of such a format allows for the communication and use of data between different programs, including VisiCalc. Movement of data from one location to another may also be accomplished with the DIF function.

Function: A mathematical or Boolean operation. VisiCalc has a number of built in functions such as @SUM, @NPV, and @IF.

Global: A command affecting all Cells or Coordinate locations on a VisiCalc worksheet. Global commands affect format, Column width, automatic or manual recalculation, and order of recalculation by Row or by Column.

Label: An alphanumeric entry in a VisiCalc Cell which is intended not to represent a mathematical value but is, in effect, the name of something. If, within a formula, reference is made to a Cell containing a label, it will be evaluated as a Zero.

Order of Recalculation: The direction in which calculations are made by VisiCalc, i. e., down the Columns, a Column at a time, or across the Rows, a Row at a time.

Overlay: The process of loading VisiCalc data (labels, formulas and values) from a previously saved file over an existing worksheet currently in RAM. Data in Cells currently in RAM will be overwritten (replaced) by data in the file which is loading for those Cells having the same Coordinates. For example, data at B4 in memory will be replaced by data in the disk file (overlay file) with the B4 Coordinates.

If the disk file contains blanks at a Coordinate location corresponding to a Coordinate currently in memory, the data at that Coordinate in RAM will remain intact. If a Coordinate in the disk file contains a local 'Format' command, but does not contain any data, the Format command will be added to the data presently contained at that Coordinate in RAM.

Pound (verb): To replace a *formula* in a Cell with the *value* resulting from that formula by placing the cursor in the desired Cell, pressing # (SHIFT and 4 or pound sign keys) and then pressing RETURN.

RAM: Random Access Memory, more accurately described as Read/Write memory. This is the volatile workspace in the computer where programs operate upon and create data.

Range: A series of consecutive Cells in the same Column or Row. A range can be represented by the beginning and ending Coordinates of the series, which must be separated by a period. Thus,

"B4 . B10"

is equivalent to

"B4 + B5 + B6 + B7 + B8 + B9 + B10".

Recursive: Description of a formula that uses *itself* as an argument. (See recursive).

Source Range: A range of Cells to be replicated elsewhere on a VisiCalc worksheet.

Target Range: A range of Cells to which a Source Range of Cells will be replicated.

Template: For those with an aversion to accounting and accounting jargon, this is a euphemism for "Worksheet".

Value: A number, the result of a mathematical formula or a Boolean expression (TRUE or FALSE). Labels are 'evaluated' by VisiCalc as Zero.

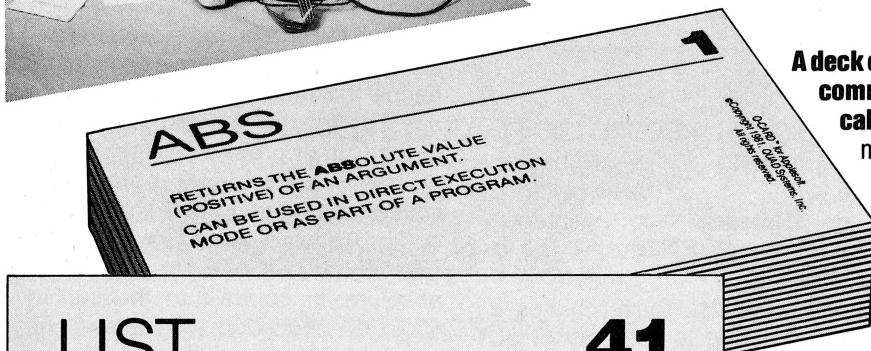
Variables: As used in VisiCalc, a value which when changed will have an effect upon other values on the worksheet. For example, changing the interest rate will change the amount of the monthly payment required to amortize a loan.

Worksheet: For those with an aversion to engineering, this is a euphemism for "Template". Also, a sheet containing Columns and Rows. VisiCalc is a blank 'electronic' worksheet. Labels (descriptions, titles, etc.), formulas and values are entered by the user. The program calculates the results of the formulas. As used in relation to VisiCalc, a worksheet generally refers to a 'model' created for a specific purpose, e. g., to calculate various values.

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PRINTS THE ENTIRE PROGRAM.

LIST 150
PRINTS LINE 150

LIST-150
PRINTS FROM THE BEGINNING OF THE PROGRAM
UP TO LINE 150

LIST 150-
PRINTS FROM LINE 150 TO THE END OF THE PROGRAM.

NOTE: TO STOP A LISTING PRESS CTRL S
TO RESTART PRESS S

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HARDWARE INDEPENDENT CONSOLE IN PASCAL

by Bill Shepard

One of the goals of the Pascal system is the development of software which is not hardware dependent. When a system is upgraded to a new processor, existing software will be compatible. In addition, software developed for various configurations can be shared. However, there is one missing element: we need a more generalized console input and output capability than is currently available.

Through the use of the SETUP procedure, a particular system can be tailored to most consoles. For the Apple II, this includes a half-dozen 80 column boards plus a serial interface to any number of display terminals. Some of these attempt to emulate the Apple, but all have unique features in terms of display control and keyboard input. Furthermore, the Apple /// console driver uses control characters which are incompatible with the Apple II.

Console Unit

The main problem is that the SETUP parameters are not available to the programmer through any standard procedures. The Console Unit presented here fills this gap.

The most valuable asset of the Console Unit is an accurate record description of the system MISCINFO file. This record definition has not been released by Apple, apparently because it is likely to change. While there is merit in this philosophy, it is far better to change one interface unit than it is to customize every piece of code. The current record definition was gleaned from a dump of the file and fortunately is the same for both Release 1.0 and 1.1 of Apple II Pascal, and for Release 1.0 of Apple /// Pascal. Thus, Pascal programs developed for the II have worked without change on the ///. Compare that with the effort required to convert Applesoft to Business BASIC!

Before delving into the specifics of the Console Unit, it is useful to note a peculiarity of Pascal record definitions which was discovered quite by accident. The two following record definitions, while functionally equivalent, do not generate identical physical records.

RECORD (1)	RECORD (2)
a,	a : Integer;
b,	b : Integer;
c, : Integer;	c : Integer;
END;	END;

The first, or list, form, creates a physical ordering in memory or on disk of c, b, a; while the second form creates the ordering of a, b, c. Apparently the compiler stacks the variables of the list and subsequently allocates them on the basis of last-in, first-out. Being unaware of this can create some trying moments while attempting to develop a record definition from a disk dump. It was similarly a challenging experience to unscramble the bit switches of the packed Boolean prefix arrays.

The Console Unit is composed of three principal sections: the INTERFACE or usage section; the IMPLEMENTATION or working section; and the INITIALIZATION section which is executed only once, at program load time.

It is not currently possible to define files in the INTERFACE section. This restriction forces the requirement to define the MISCINFO file in the IMPLEMENTATION section. All references to the MISCINFO file should be in the INTERFACE section. Placing them in the IMPLEMENTATION section obscures the clarity and simplicity of the interface. However, this presents no operational problems. The type definitions for Cursor Type, Key Type, and Info Record also fall into this category. It is hoped future

releases of the Pascal compiler will lift this restriction.

Display Control

Program control of the display is provided by a set of procedures which position the cursor and erase selected areas. The procedure names clearly define the function and are easy to use. The line and column parameters of the Cursor procedures are relative to the current cursor position. A statement of Cursor Up (2) moves the cursor up two lines. Conversely, the ERASE and LOCATE parameters are absolute. In contrast to the built-in GOTOXY procedure, all line and column variables are relative to 1. That is, the first line of the display is Line 1, not Line 0. In the LOCATE procedure, the line also follows the column. I find this definition more natural and easier to use.

Program access to the keyboard control is provided through the Read Keyboard and Read String procedures. The primary value of using them, in place of a simple Pascal Read, lies in providing a standard access to full keyboard control. For example, the program can use the Accept and Escape keys defined for the Editor without unique coding. The Entry Types define the possible key entries.

Read String is defined as a function. This permits the using procedure to recognize the entry of an ESCAPE after entering some characters, or the entry of only a RETURN without any preceding characters.

The IMPLEMENTATION procedures are generally straightforward, but a few highlights may be helpful.

The Apple II system does not support the Erase Line function. Thus, the Setup definition for this becomes a null. In implementing the Erase Line

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Number	3
Data Surfaces	6
Diameter (inches/cm)	5.25/13.33

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Access Time Track To Track (3 milliseconds)	
Disk Rotational Speed	3600 rpm
Peak Transfer Rate	5 MB/S

UTILITIES

Format	Formats All Surfaces
Volume Initiator	Initializes With An "EMPTY" File A Given Number Of Volumes
File Finder	Finds All Volumes On Which Any Given File Is Resident
File Runner	Finds & Runs The Given File From The First Volume On Which It Is Resident
Partition	Partitions The Disk For DOS 3.3, CPM & PASCAL Allocating The Required Number Of Sectors For Each Given Operating System
CPM Boot	Permits Booting In CPM Operating System
PASCAL Boot	Permits Booting In PASCAL
Connect	Connects Gallium To DOS If Booted From Floppy Disk

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procedure, it is necessary to use a combination of cursor positioning to the beginning of a line and the Erase to end of line to accomplish this same function.

Translation of the keyboard entry to a recognizable form as a specific Entry Type requires a knowledge of whether the preceding key was a prefix or lead-in key. Once this is established, the entry is translated through a direct table addressing. A pair of translate tables is initialized at load time to the values specified in the MISCINFO file. By using the entered character as a subscript, the replacement value is immediately accessed. This technique minimizes the amount of coding and is fast to execute.

The INITIALIZATION section reads the MISCINFO file and interprets the contents into the console strings and prefix arrays. Proper definition simplifies the coding. The CRT Prefix and Key Prefix variables within Info record are defined as packed Boolean arrays. This allows direct access to these indicators without resorting to the division and mod extraction techniques

required by BASIC when using packed bit switches.

The WRITE procedures for "At," "On," and "Centered" have equal utility for developing displays which are optically balanced and, at the same time, are compatible with 40, 64, and 80 column consoles.

The PAUSE and DELAY procedures are quite useful when coding interactive menu driven applications.

Info List

INFO LIST is a brief program developed to list the contents of the MISCINFO file. INFO LIST takes advantage of the file definitions which are included in the INTERFACE section of the Console Unit, even though these properly belong in the IMPLEMENTATION domain. The reopening of the MISCINFO file is only required here because of the desire to display all of the detail in the file. For normal unit usage this would be unnecessary. Since this type of information is often required when the MISCINFO file is not set up correctly, two modes of

operation are established. The most elementary omits all console control operations. This program is particularly useful to anyone setting up a console.

Perhaps some future release of the Pascal system will support hardware independent keyboard and display procedures, but until that happens, units such as the Console Unit can serve as a very useful substitute.

Bill Shepard is currently Director of Information Systems for the Oregon State Legislature. His responsibilities include direction of all activities and planning for information retrieval, text and data processing, publications, and media services. Prior to joining the Legislature in 1977, Bill spent twelve years with Boeing Aircraft and Boeing Computer services. Automation of the maintenance publications, including automated illustration and text illustration merge, was a major accomplishment.



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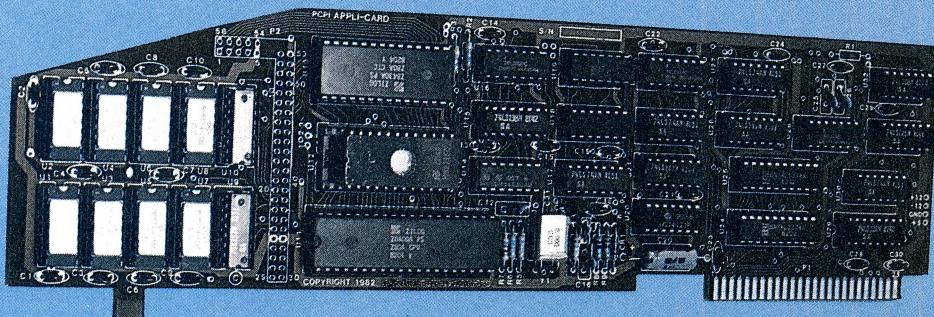
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A self-contained Z-80A or Z-80B with memory	No	No	Yes
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(* \$S+,V- *)
UNIT Console_Unit;

```

INTERFACE

CONST
  rule_width          = 80;           (* INTERFACE *)
  blanks_width        = 133;          : Integer;
  crt_width           : Integer;      : String [blanks_width];
  crt_depth           : Integer;      : String [rule_width];
  crt_midPoint        : Integer;      : String [rule_width];

TYPE (* INTERFACE *)
  Entry_Type          : INTERFACE;
  (* IMPLEMENTATION *)
  Cursor_Type         : IMPLEMENTATION;

  VAR
    crt_width          : Integer;      : String [rule_width];
    crt_depth           : Integer;      : String [rule_width];
    crt_midPoint        : Integer;      : String [rule_width];
    blanks              : Integer;      : File of Info_Record;
    rule               : String [rule_width];
    (* IMPLEMENTATION *)
    (* $P *)
    info_file          : String [rule_width];
    (* $P *)
    cursor_home         : Integer;      : PROCEDURE Cursor_Home;
    cursor_up            : Integer;      : PROCEDURE Cursor_UP (lines : Integer);
    cursor_down          : Integer;      : PROCEDURE Cursor_Down (lines : Integer);
    cursor_left          : Integer;      : PROCEDURE Cursor_Left (columns : Integer);
    cursor_right         : Integer;      : PROCEDURE Cursor_Right (columns : Integer);

    erase_display        : PROCEDURE Erase_Display;
    erase_current_line   : PROCEDURE Erase_Current_Line;
    erase_line           : PROCEDURE Erase_Line (line : Integer);
    erase_EOL             : PROCEDURE Erase_EOL;
    locate_line           : PROCEDURE Locate_Line (line : Integer);
    locate                : PROCEDURE Locate (line, column : Integer);
    locate_line           : PROCEDURE Locate_Line (line : Integer);
    locate_column          : PROCEDURE Locate (line, column : Integer);

    read_keyboard         : PROCEDURE Read_Keyboard (VAR entry : Entry_Type;
                                                       VAR key : Char);
    read_string           : FUNCTION Read_String (size : Integer) : String;
    read_item              : PROCEDURE Read_Item (line, column : Integer;
                                                   item : String);

    write_at              : PROCEDURE Write_At (line, column : Integer;
                                               item : String);
    write_centered         : PROCEDURE Write_At_Centered (line, column : Integer;
                                                          item : String);
    write_on               : PROCEDURE Write_On (line, column : Integer;
                                              item : String);

    write_on_centered     : PROCEDURE Write_On_Centered (line, column : Integer;
                                                          item : String);
    write_centered         : PROCEDURE Write_Centered (item : String);
    write_ln_centered      : PROCEDURE Write_Ln_Centered (item : String);
    writeIndented          : PROCEDURE Write_Indented (indent : Integer;
                                                       item : String);
    writeLnIndented        : PROCEDURE Write_Ln_Indented (indent : Integer;
                                                          item : String);

    pause                 : PROCEDURE Pause;
    delay                : PROCEDURE Delay (seconds : Real);

  END (* Info_Record *);
```

Pascal Console Program Listing

```

(* $P *)

IMPLEMENTATION

TYPE CC_String          P = String [2];
VAR key_lead_in,        : Char;
    null                : Integer;
    count               : Integer;
    tr-key-Prefixed,   : Packed Array [Char];
    tr-key-non-Prefixed
    OF Entry_Type;
    (* Console Controls *)
    cc-home,
    cc-up,
    cc-down,
    cc-left,
    cc-right,
    cc-display-erase,
    cc-eol-erase,
    cc-eos-erase,
    cc-line-erase
    : CC_String;

PROCEDURE Cursor_Home;
BEGIN
  Write (cc-home);
END (* Cursor_Home *);

PROCEDURE Cursor_UP (* lines : Integer);
BEGIN
  FOR count := 1 TO lines
  DO
    Write (cc-up);
  END (* Cursor_UP *);
END (* $P *)

PROCEDURE Cursor_Down (* lines : Integer);
BEGIN
  FOR count := 1 TO lines
  DO
    Write (cc-down);
  END;
END (* $P *)

PROCEDURE Cursor_Left (* columns : Integer);
BEGIN
  FOR count := 1 TO columns
  DO
    Write (cc-left);
  END (* Cursor_Left *);
END (* $P *)

PROCEDURE Cursor_Right (* columns : Integer);
BEGIN
  FOR count := 1 TO columns
  DO
    Write (cc-right);
  END (* Cursor_Right *);
END (* $P *)

PROCEDURE Locate_Line (* line : Integer);
BEGIN
  Go_To_XY (0, (line - 1));
END (* Locate_Line *);

PROCEDURE Locate (* line, column : Integer);
BEGIN
  Go_To_XY ((column - 1), (line - 1));
END (* Locate *);

(* $P *)
PROCEDURE Erase_Display;
BEGIN
  Write (cc_display_erase);
END (* Erase_Display *);

PROCEDURE Erase_EOL;
BEGIN
  Write (cc_eol_erase);
END (* Erase_EOL *);

PROCEDURE Erase_Current_Line;
BEGIN
  Write (cc_eol_erase);
END (* Erase_Current_Line *);

PROCEDURE Erase_Line (* line : Integer);
BEGIN
  Locate_Line (line);
  Erase_Current_Line;
END (* Erase_Line *);

PROCEDURE Erase_EOS;
BEGIN
  Write (cc_eos_erase);
END (* Erase_EOS *);
END (* $P *)

```

Pascal Console Program Listing

Pascal Console Program Listing

```

(* $P *)
PROCEDURE Write_At (* line,
column
item : String *); : Integer;
: String *);

BEGIN
Erase_Line (line);
Locate (line, (column + 1));
Write (item);
END (* Write_At *);

PROCEDURE Write_At_Line (* line
item : String *); : Integer;
: String *);

BEGIN
Erase_Line (line);
Write (item);
END (* Write_At_Line *);

PROCEDURE Write_At_Centered (* line
item : String *); : Integer;
: String *);

BEGIN
Erase_Current_Line;
WriteLn (Copy (blanks, 1,
(crt_midPoint - (Length (item) DIV 2))), item);
END (* Write_Ln_Centered *);

PROCEDURE Write_Indented (* indent
item : String *); : Integer;
: String *);

BEGIN
Erase_Current_Line;
Write (Copy (blanks, 1, indent), item);
END (* Write_Indented *);

PROCEDURE Write_Ln_Indented (* indent
item : String *); : Integer;
: String *);

BEGIN
Erase_Current_Line;
WriteLn (Copy (blanks, 1, indent), item);
END (* Write_Ln_Indented *);

(* $F *)
PROCEDURE Set_Length (VAR text_string : String;
new_length : Integer);
(* Set the length of a string to a predetermined value. *)

BEGIN
Erase_Line (line);
Locate (line, (crt_midPoint - (Length (item) DIV 2) + 1));
Write (item);
END (* Write_At_Centered *);

PROCEDURE Write_Dn (* line,
column
item : String *); : Integer;
: String *);

BEGIN
Locate (line, (column + 1));
Write (item);
END (* Write_Dn *);

PROCEDURE Write_Dn_Centered (* line
item : String *); : Integer;
: String *);

BEGIN
Locate (line, (crt_midPoint -
(Length (item) DIV 2) + 1));
Write (item);
END (* Write_Dn_Centered *);

PROCEDURE Write_Dn_Centered (* line
item : String *); : Integer;
: String *);

VAR
key : Char;

BEGIN
Write_Ln;
Write (*Press any key to continue*);
Read (keyboard, key);
Cursor_UP (1);
WriteLn;
Erase_EOL;
Cursor_UP (1);
END (* Pause *);

PROCEDURE Pause;

BEGIN
Erase_Current_Line;
Write (Copy (blanks, 1,
(crt_midPoint -
(Length (item) DIV 2))), item);
END (* Write_Centered *);

```

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```

PROCEDURE Read_Keyboard (* VAR entry : Char *); : Entry-Type;
(* The first non-lead-in character is located.
   "entry" is set to the value of this input
   character and "key" is set to its ASCII
   value *)
BEGIN
  Read (Keyboard, key);
  IF (key_lead_in <> null) AND (key_lead_in = key)
  THEN
    BEGIN
      REPEAT
        Read (Keyboard, key);
        UNTIL key <> key_lead_in;
        entry := tr-key-prefix[key];
      END (* THEN *)
    ELSE
      entry := tr-key-non-prefix[key];
    END (* Read_Keyboard *)
  END (* $P *)
FUNCTION Read_String (* size : Integer; item : String): Boolean;
VAR
  done : Boolean;
  ch : Char;
  entry : Entry-Type;
  next : String [1];
BEGIN
  item := '^';
  next := entry;
  done := false;
  REPEAT
    Read_Keyboard (entry, ch);
    CASE entry
    OF
      left,
      del-char: BEGIN
        IF Length (item) > 0
        THEN
          BEGIN
            Cursor_Left (1);
            Erase_EOL;
            Set_Length (item,
                        (Length (item) - 1));
          END;
        END;
    END;
  END;
  entry := '^';
  Read_String := true;
  done := true;
END;
PROCEDURE Delay (* seconds : Real *);
(* Timing constants are set for the Apple ///
   with display on. *)
VAR
  limit,
  cycle
BEGIN
  limit := Round (250.0 * seconds);
  cycle := 0;
REPEAT
  cycle := cycle + 1;
UNTIL cycle > limit;
END (* Delay *);

del-line: BEGIN
  IF Length (item) > 0
  THEN
    BEGIN
      Cursor_Left (Length (item));
      Erase_EOL;
      item := '^';
    END;
END;

escape: BEGIN
  item := '^';
  Read_String := false;
  done := true;
END;
accept: BEGIN
  IF Length (item) = 0
  THEN
    item := '^';
    done := true;
  END;
END;
other: BEGIN
  IF EOLN (Keyboard)
  THEN
    BEGIN
      IF Length (item) = 0
      THEN
        Read_String := false;
      done := true;
    END (* THEN *)
  ELSE
    BEGIN
      IF EOLN (Keyboard)
      THEN
        BEGIN
          Write (ch);
          next [1] := ch;
          item := Concat (item, next);
        END (* THEN *)
      ELSE
        BEGIN
          Write (ch);
          next [1] := ch;
          item := Concat (item, next);
        END (* THEN *)
      END;
    END;
  END;
END;

```

Pascal Console Program Listing

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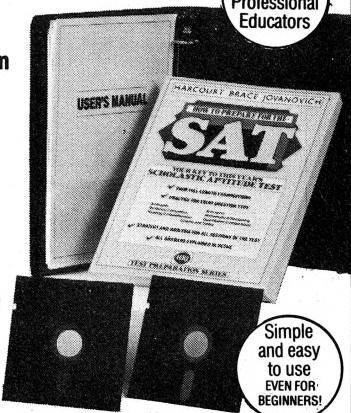
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```

(* $P *)
PROCEDURE Init_Console_Controls;
  : Char;
  : Cursor_Type;
  : Entry_Type;
  : Entry_Type);

PROCEDURE Init_CC (crt_cc : Char;
                  crt_cursor : Cursor_Type;
                  VAR cc : CC_String);
BEGIN
  WITH info_file^
  BEGIN
    IF crt_cc = null
    THEN
      cc := '^';
    ELSE
      BEGIN
        IF crt_prefix [crt_cursor]
        THEN
          BEGIN
            Set_Length (cc, 2);
            cc [1] := crt_lead_in;
            cc [2] := crt_cc;
          END
        ELSE
          BEGIN
            Set_Length (cc, 1);
            cc [1] := crt_cc;
          END
        END (* ELSE *);
      END (* Init_CC *);
    END (* Init_Console_Controls *);
    WITH info_file^
    BEGIN
      IF crt_cc = null
      THEN
        BEGIN
          cc := '^';
          cc [1] := crt_cc;
        END
      ELSE
        BEGIN
          cc := crt_cc;
        END
      END (* ELSE *);
    END (* Init_CC *);
  END (* Init_Console_Controls *);
END (* Init_CC *);

(* $P *)
PROCEDURE Init_Key (key_ch : Key_Type;
                    key_name : Entry_Type);
  : Char;
  : Cursor_Type;
  : Entry_Type);

PROCEDURE Init_Prefixed [key_name];
  : Char;
  : Cursor_Type;
  : Entry_Type);

BEGIN
  WITH info_file^
  BEGIN
    IF key_prefixed [key_name]
    THEN
      tr_key_prefixed [key_ch] := entry;
    ELSE
      tr_key_non_prefixed [key_ch] := entry;
    END (* Init_Key *);
  END (* Init_Prefixed *);

BEGIN (* Init_Key_Translate *)
key_lead_in := info_file^.key_lead_in;
FOR ch := null TO Chr (255)
DO
  BEGIN
    tr_key_prefixed [ch] := other;
    tr_key_non_prefixed [ch] := other;
  END (* FOR *);
  WITH info_file^
  DO
    BEGIN
      Init_Key (key_del_char, del_char_key, del_line_key);
      Init_Key (key_del_line, del_line_key, del_line);
      Init_Key (key_up, up_key, up);
      Init_Key (key_down, down_key, down);
      Init_Key (key_left, left_key, left);
      Init_Key (key_right, right_key, right);
      Init_Key (key_accept, accept_key, accept);
      Init_Key (key_escape, escape_key, escape);
    END (* Init_Key_Translate *);
    (* $P *)
    BEGIN (* Console Initialization *)
      Set_Length (blanks, blanks_width);
      Fill_Char (blanks [1], blanks_width, ' ');
      null := Chr (0);
      Reset (info_file, *SYSTEM.MISCINFO*);
      IF NOT EOF (info_file)
      THEN
        BEGIN
          Init_CC (crt_home,
                   home_Position, cc_home);
          up_cursor, cc_up);
          up_cursor, cc_left);
          left_cursor, cc_left);
          right_cursor, cc_right);
          right_cursor, cc_right);
          display_erase, cc_display_erase);
          display_erase, cc_display_erase);
          eol_erase, cc_eol_erase);
          eos_erase, cc_eos_erase);
          IF crt_line_erase = null
          THEN
            cc_line_erase := cc_eol_erase
          ELSE
            Init_CC (crt_line_erase, line_erase, cc_line_erase);
            Set_Length (cc_down, 1);
            cc_down [1] := Chr (10);
            crt_width := screen_width;
            crt_depth := screen_depth;
            crt_midpoint := crt_width DIV 2;
        END (* Init_Console_Controls *);
        Set_Length (rule, crt_width);
        Fill_Char (rule [1], crt_width, ' ');
      END (* THEN *)
      ELSE
        BEGIN
          Init_Console_Controls;
          Init_Key_Translate;
          Set_Length (rule, crt_width);
          Fill_Char (rule [1], crt_width, ' ');
        END (* ELSE *)
    END (* Init_Key_Translate *);
    WriteLn ('*SYSTEM.MISCINFO file is empty!;');
    Exit (Program);
  END (* ELSE *);
  Close (info_file, lock);
END (* Init_Key *);

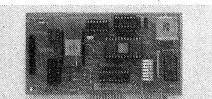
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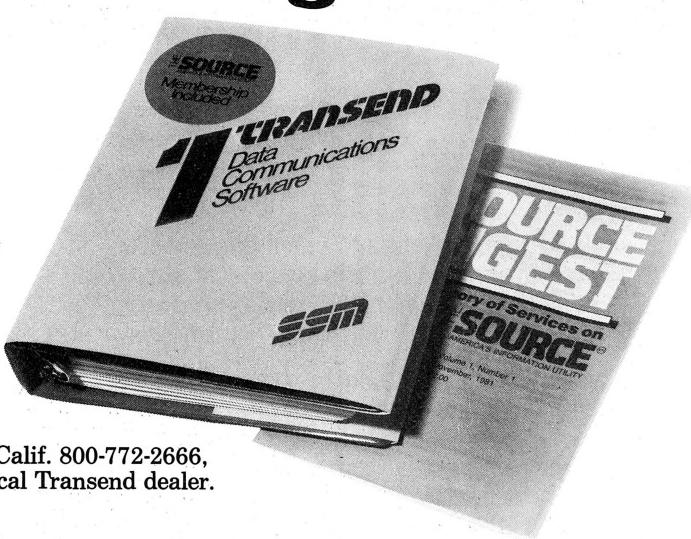
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```

PROGRAM Info_List;
{Display the content of the system MISCTINFO file.}

USES
  ($U Console.Code)
  Console_Unit;

VAR
  response           : Char;
  valid-setup        : Boolean;
  index              : Integer;
  tab                : String;
  cursor-index       : Cursor_Type;
  key_index          : Key_Type;
  cursor-names       : Array [Cursor_Type] OF String;
  key_names          : Array [Key_Type] OF String;

PROCEDURE New_Display;
BEGIN
  IF valid-setup THEN
    BEGIN
      Erase_Display;
      Write (rule);
      Write_Centered (1, ' Console Control Information ');
      Write_Ln;
      Write_Ln;
      END (THEN)
    END ELSE
    BEGIN
      Write_Ln;
      Write_Centered ('Console Control Information');
      Write_Ln;
      Write_Ln (rule);
      Write_Ln;
      END (ELSE);
    END (New_Display);

PROCEDURE Hold;
BEGIN
  IF valid-setup THEN
    BEGIN
      Pause;
      END (ELSE);
    BEGIN
      Write_Ln;
      Write ('RETURN to continue: ');
      Read (response);
      Write_Ln;
      END (ELSE);
    END (Hold);
END (Info_List);

```

```

PROCEDURE Display_CRT_Prefixes;
BEGIN
  New_Display;
  WITH info_file^
  DO
    BEGIN
      index := 0;
      tab := COPY (blanks, 1, (crt_midPoint - 20));
      FOR cursor_index := up_cursor TO line_erase
      DO
        BEGIN
          index := index + 1;
          IF crt_prefix [cursor_index]
          THEN
            Write_Ln (tab, index:2, ': Prefix - ', cursor_names [cursor_index])
          ELSE
            Write_Ln (tab, index:2, ': NOT Prefix - ', cursor_names [cursor_index]);
        END (FOR);
      END (WITH);
    END;
END (Display_CRT_Prefixes);

```

```

($P)
PROCEDURE Display_Key_Prefixes;
BEGIN
  New_Display;
  WITH info_file^
  DO
    BEGIN
      index := 0;
      tab := COPY (blanks, 1, (crt_midPoint - 20));
      FOR key_index := right_key TO accept_key
      DO
        BEGIN
          index := index + 1;
          IF key_prefix [key_index]
          THEN
            Write_Ln (tab, index:2, ': Prefix - ', key_names [key_index], ' key');
          ELSE
            Write_Ln (tab, index:2, ': NOT Prefix - ', key_names [key_index], ' key');
        END (FOR);
      END (WITH);
    END;
END (Display_Key_Prefixes);

```

Pascal Console Program Listing

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Pascal Console Program Listing

```

($FP) PROCEDURE Initialize;
BEGIN
  valid_setup := false;
  cursor_names [line_erase] := 'Line erase';
  cursor_names [display_erase] := 'Display erase';
  cursor_names [left_cursor] := 'Delete character';
  cursor_names [home] := 'Move cursor home';
  cursor_names [EOS_erase] := 'Erase to end of screen';
  cursor_names [EOI_erase] := 'Erase to end of line';
  cursor_names [right_cursor] := 'Move cursor right';
  cursor_names [up_cursor] := 'Move cursor up';

  key_names [accept] := 'Accept';
  key_names [escape_key] := 'Escape';
  key_names [del_line_key] := 'Delete line';
  key_names [non_Printing] := 'Non-Printing character';
  key_names [Unknown] := 'Unknown';
  key_names [del_char_key] := 'Delete character';
  key_names [stop] := 'Stop';
  key_names [break] := 'Break';
  key_names [flush] := 'Flush';
  key_names [end_file] := 'End file';
  key_names [right_key] := 'Right';
  key_names [left_key] := 'Left';
  key_names [down_key] := 'Down';
  key_names [up_key] := 'Up';
END;

```

```

  END;
  ($FP)
  PROCEDURE CRT_Characters;
  BEGIN
    New_Display;
    WITH info_file^ DO
      BEGIN
        tab := Copy (blanks, 1, (crt_midPoint - 13));
        tab := Copy (tab, key_lead_in);
        Write_Ln (tab, key_lead_in);
        Write_Ln (tab, key_up);
        Write_Ln (tab, key_down);
        Write_Ln (tab, key_left);
        Write_Ln (tab, key_right);
        Write_Ln (tab, key_end_file);
        Write_Ln (tab, key_to_end_file);
        Write_Ln (tab, key_flush);
        Write_Ln (tab, key_break);
        Write_Ln (tab, key_stop);
        Write_Ln (tab, key_delete_character);
        Write_Ln (tab, key_delete_line);
        Write_Ln (tab, key_escape);
        Write_Ln (tab, escape_character);
        Write_Ln (tab, accept_character);
        Write_Ln (tab, non_Printing_character);
      END (WITH);
      Hold;
    END (Keys);
  END;
  ($FP)
  BEGIN (Info_List)
    Initialize;
    New_Display;
    Write ('Is the current setup ok? ');
    Read (response);
    valid_setup := response IN ['Y', 'y'];
    Reset (info_file, '*SYSTEM.MISCINFO');
    IF EOF (info_file)
      THEN
        BEGIN
          Write_Ln ('*SYSTEM.MISCINFO file is empty! ');
          Exit (Program);
        END (THEN)
        ELSE
          BEGIN
            REPEAT
              CRT_Characters;
              Display_CRT_Prefixes;
              Keys;
              New_Display;
              Write ('Repeat list? ');
              Read (response);
              UNTIL NOT (response IN ['Y', 'y']);
            END (ELSE);
            IF valid_setup
              THEN
                Erase_Display;
            ELSE
              FOR index := 1 TO 24
                DO
                  Write_Ln;
        END.

```

```

PROCEDURE Keys;
BEGIN
  New_Display;
  WITH info_file^ DO
    BEGIN
      tab := Copy (blanks, 1, (crt_midPoint - 13));
      tab := Copy (tab, key_lead_in);
      Write_Ln (tab, key_lead_in);
      Write_Ln (tab, key_up);
      Write_Ln (tab, key_down);
      Write_Ln (tab, key_left);
      Write_Ln (tab, key_right);
      Write_Ln (tab, key_end_file);
      Write_Ln (tab, key_flush);
      Write_Ln (tab, key_break);
      Write_Ln (tab, key_stop);
      Write_Ln (tab, key_delete_character);
      Write_Ln (tab, key_delete_line);
      Write_Ln (tab, key_escape);
      Write_Ln (tab, escape_character);
      Write_Ln (tab, accept_character);
      Write_Ln (tab, non_Printing_character);
    END (WITH);
    Hold;
  END (Keys);
END;

```

Forbidden Fruit

NEW PRODUCTS FOR THE APPLE

Edited by
Mark L. Crosby



Producers of products for the Apple line of computers should send news releases two months in advance to:

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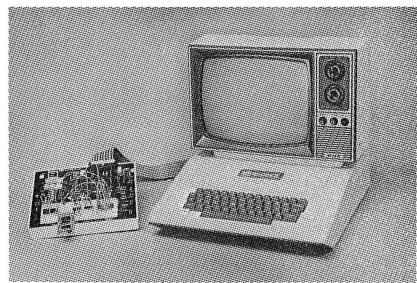
INPUT/OUTPUT

The **Synergizer** from ALS, Inc., offers Apple users CP/M compatibility, expanded RAM, 80-column display, and increased word processing software compatibility. The Synergizer consists of an implementation of the CP/M operating system and three peripherals: Smarterm, an 80-column display board; Z-Card, the ALS Z-80A processor for the Apple which provides CP/M capabilities for both the Apple II and Apple //I; and Add-Ram, the 16K RAM board that permits addressing of the full memory supported by the Z80A processor (and the 6502 in the Apple) - \$749 for the total system. ALS, 1195 E. Arques Avenue, Sunnyvale, CA 94086 (408) 727-6805.

Slot Swappers is a hardware device for the Apple II, which remedies problems caused by slot dependent software and hardware. Slot Swappers interchanges two slots with the flip of a switch to avoid hardware damage and to eliminate card manipulation. Additional information about Slot Swappers is available from Johnson Associates, Box 1870, Phoenix, AZ 85001 (602) 979-4554 - \$79.95.

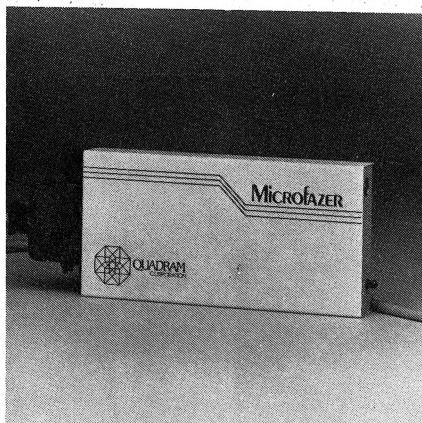
The **Apple Breadboard Interface** provides controlled access to those signals in the Apple microcomputer needed to communicate with and to control external devices. Programs can then be written using the BASIC language. Thus the user is enabled to design and operate custom interfaces to meet individual applications without necessarily having knowledge of machine or Assembly languages or the internal circuitry of the microcomputer. The data bus is fully buffered; a unique scheme protects it in the event that wiring errors have occurred; up to eight de-

coded outputs are available either in the device addressing mode or in the memory addressing mode. Up to 256 input/output (I/O) devices may be addressed. A probe circuit permits detection of logic signals and pulse edges. Experiments can be performed and interface circuits tested using hookup wire and the solderless breadboard through which all of the interface signals are made available. The breadboard is available as a kit (\$210) or completely assembled (\$275). Requires cables - \$14.95. Shipping \$3.50. **Apple Interfacing**, a 206-page text instructs the reader in the design of custom interfaces using the Apple Interface Breadboard. It covers the construction of device address decoders, input ports, output ports, and synchronization signals. Hardware interfaces and software listings are shown for A/D and D/A converters, programmable interface chips, data loggers, a traffic light controller, and a digital logic tester. The text includes 16 experiments that can be performed by the user - \$10.95 plus \$1 shipping. Group Technology, Ltd., P. O. Box 87, Check, VA 24072 (703) 651-3153.



Interfazer I/O Controller contains up to 128K RAM buffer. Features 12 memory and I/O ports, Multi-User printer controller, Peripheral Multiplexer, Data Transfer Rate Converter, Incompatible Device Interface, Computer I/O Expander. Applications permit multiple users to share a single printer; operates as a peripheral buffer; etc. Up to ten easy to install I/O cards can be added to the Basic Unit. Self-

contained power supply. Cost of basic InterFazer unit is approximately \$700. Actual price is dependent on the configuration. For information contact: Quadram Corporation, 4357 Park Drive, Norcross, GA 30093 (404) 923 - 6666.



MiniMega is a 5 1/4" Hard Disk with floppy backup, designed to work with most microcomputers. Host adapters enable interfacing to Apple II and //I, IBM Personal Computer, TRS-80, NEC PC-8000, all S-100 systems, LSI-11, Multibus, and Motorola 6800. All CP/M programs will work with machines now running CP/M. The MiniMega is available in 5 or 10 MByte configurations alone, or integrated with a 5 1/4" 1 MByte floppy backup, packaged in a compact cabinet. Santa Clara Systems, Inc., 560 Division Street, Campbell, CA 95008 (408) 374 - 6972.

The **GALLIUM 10 Winchester Disk Subsystem** offers an unformatted capacity of 14.4 Megabytes and formatted capacity of 11.3 Megabytes. Each controller is capable of driving up to 4 Winchester disk drives for a total formatted capacity of 45 Megabytes. The GALLIUM 10 is compatible with all operating systems available for the Apple Computer - DOS 3.3, Pascal, and CP/M. Contact XitenSystems, 16815 Hawthorne Blvd., Lawndale, CA 90260 (213) 370 - 3966 or outside CA (800) 421 - 1947.



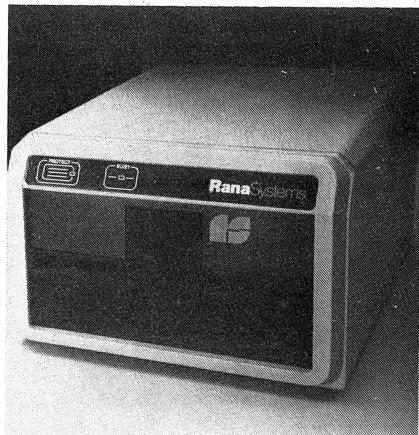
The **Remote Operating System (R O S)** disk access cards and software from Softworks provides multiple Apple II users the capability of utilizing the disk storage available from one central Apple computer. R O S allows remote computers easy

access and transmission of both Applesoft and Integer programs to the central system using standard Apple DOS commands. With the R O S disk access card, an educator will be able to allow students the flexibility of a floppy disk drive without the costs associated with purchasing a separate disk drive for each computer. Up to 127 remote computers may be connected to one central Apple II system containing up to 8 floppy disk drives (1,048,576 bytes of storage). Remote users connected to a multiple disk system may select the appropriate disk drive to access by using an easy-to-understand letter designation. Allows optional automatic file lock out and drive access restrictions. The R O S disk access card may be installed in any slot in the central system and actually allows more free memory in the remote system than the Apple II DOS. Installation programs provide easy configuration and set up, while special commands add to the flexibility of the system. Starter system contains one central board and two remote boards, software and connecting cable - \$640. Single remote board and cable - \$189. Three remote boards and cable - \$540. Single central board and system software - \$309. Softworks, Inc., 14805 N. 73rd Street, Suite J, Scottsdale, AZ 85260 (602) 998 - 3986.

Mediamix has released a new RS-232C serial version of their **Electronic Typewriter Interface (ETI²)**. This new unit provides for RTS or BUSY signals, XON/XOFF and STX/ETX communications protocols. The ETI² allows the user to interface an IBM Electronic Typewriter with IBM, DEC, Xerox 820, Osborne-1, and other computers which are limited to RS-232C serial type printers - \$595. The Centronics compatible parallel version is suitable for use with most personal computers including the Apple II - \$495. Both versions feature a 2,000 character text buffer and a library of over 39 commands. Mediamix, P.O. Box 67B57, Los Angeles, CA 90067 (213) 475 - 9949.

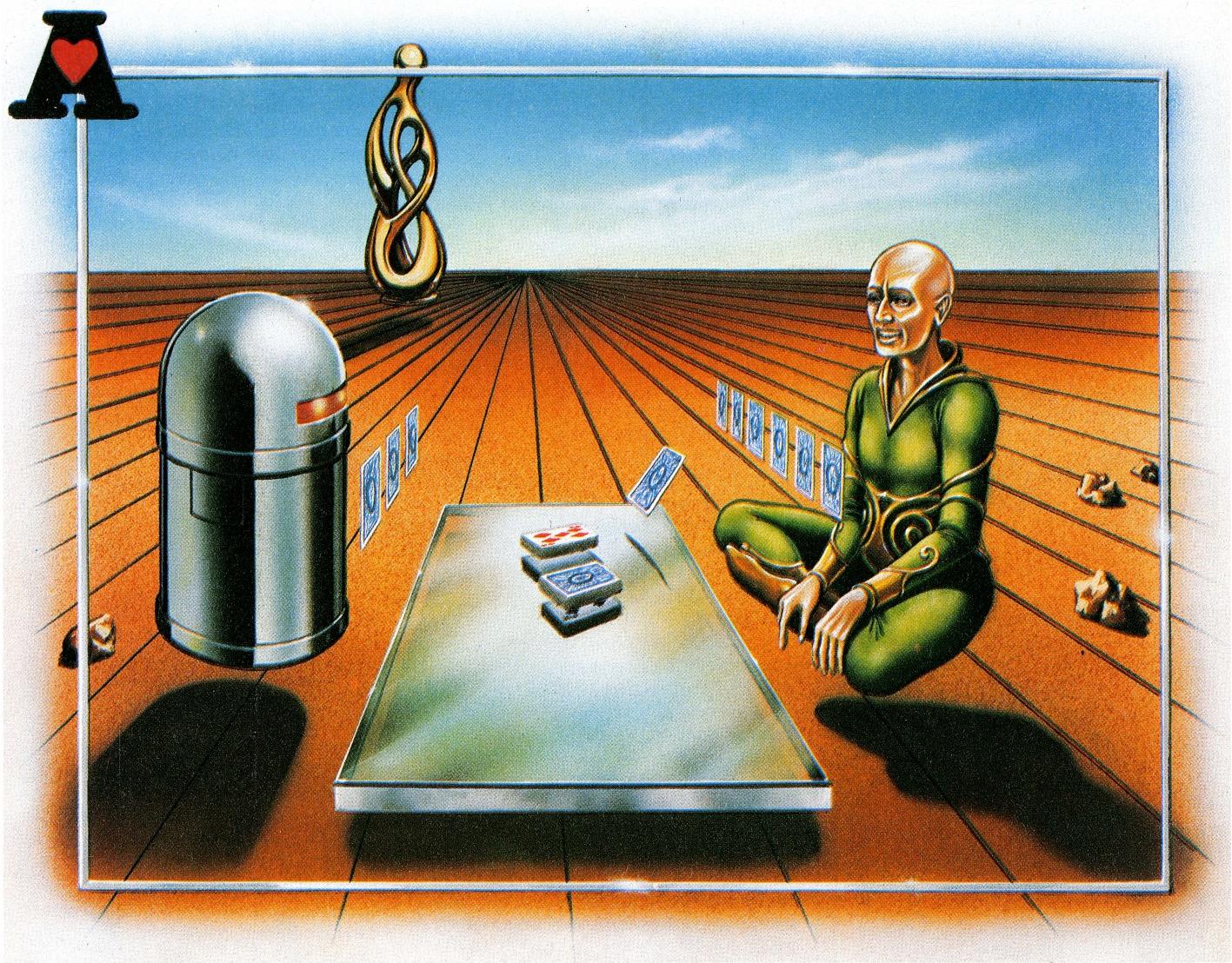
A series of high-density single and double sided floppy **Disk Drive Subsystems** compatible with Apple II computers is now available. They feature superior performance and greater capacity than currently available Apple drives at a significantly lower cost per byte. The Elite One provides users with capacity approximately 14% greater than existing drives. Higher level units offer up to four times the capacity of comparable Apple drives. Advantages include: Single and Double sided heads, an advanced head positioning mechanism which improves positioning accuracy and triples track-to-track speed, a motor-control circuit incorporating a unique 'stall' provision that insures against spin-motor burnout, gentler clamping action and more accurate

diskette centering due to longer diskette-centering cone, automatic 'power down' of analog components during standby state of reduced power consumption. Controller can handle one, two, three or four minifloppies which may be any combination of Apple or Rana drives. Automatically boots 13 and 16 sector diskettes. Compatible with Apple DOS, CP/M and Pascal. Elite One (single sided) 40 track - \$449; Elite Two (double sided) 40 track - \$649; Elite Three (double sided) 80 track - \$849; Elite Controller - \$135. Rana Systems, 20620 Leapwood Avenue, Carson, CA 90746 (213) 538 - 2353.



From Xebec comes a **5 Megabyte Hard Disk Kit** which you can assemble yourself (it's simple). What you get are the components of a top-quality, high-reliability mass storage disk subsystem, including the following: A state-of-the-art 5.25-inch Winchester-type rigid disk drive; Xebec advanced single board controller; a high-reliability 115V/230V power module; cable set; a host adapter personality card (plugs into an Apple slot); Apple DOS 3.3, CP/M or Pascal software; a component cabinet and complete installation instructions and documentation - \$1,299 includes freight! Xebec/Hardcorps, 432 Lakeside Drive, Sunnyvale, CA 94086 (408) 733 - 4200.

New from Novation, the **212 Apple-Cat II LSI direct connect, 1200 Baud, Full Duplex Modem** allows communication with any Bell 212A compatible data set. It consists of Novation's 212 Upgrade Module installed in an Apple II along with Novation's Apple-Cat II. All Apple-Cat II operational characteristics and optional features are retained including: automatic dialing (pulse or tone); redialing; auto-answering and disconnect; alternate voice operation; file transfer and printer interfacing functions; and deaf terminal mode. The 212 Apple-Cat II is available for \$725 and the 212 Apple-Cat Upgrade option is \$339. Novation, Inc., 18664 Oxnard Street, Tarzana, CA 91356 (213) 996 - 5060.



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2660 West Chester Pike, Broomall, PA 19008 (215) 359-1004 or (800) 543-3000 Ext. 3443.

MISCELLANEOUS

A new 13-inch general purpose **Color Data Display Monitor** has been designed for the commercial/industrial small computer market. The stylish ECM-1301 features the latest in advanced circuitry and is available in both medium (580 x 235) pixels and high (720 x 512 pixels) resolution, complete with six user controls. The unit is directly compatible with the IBM personal computer and with eight color TTL level computers. For further information, contact: Electrohome Limited, 809 Wellington Street N., Kitchener, Ontario, Canada N2G 4J6.



Finally an inexpensive **Universal Printer Buffer** that can be used with all popular micro-computers and parallel printers has been announced by Quadram Corp. Called MicroFazer, the parallel in/parallel out data buffer uses standard Centronics signals and can draw needed power from many printers. Separate low voltage power supply (9 volt, 500 ma.) is available where required. Standard calculator or battery chargers can be used. Controlled by a custom LSI, MicroFazer receives data from the computer at up to 4,000 characters per second. The data is then transferred to the printer as rapidly as the printer can handle it. Buffering of 8, 16, 32 or 64K is available in the four models of MicroFazer. Packaged in a small case (3.5" x 7" x 1"), it is engineered to be mechanically attached directly to the input port of the Epson and other similar printers. Simply remove the existing cable from the printer and plug into the MicroFazer. The end user can connect MicroFazer in less than 60 seconds. 8K - \$159, 16K - \$189, 32K - \$225, 64K - \$299. Quadram Corporation, 4357 Park Drive, Norcross, GA 30093 (404) 926-6666.

VERSAbox is an **Intelligent Spooler/Buffer** with an optional real time clock interface/display. VERSAbbox's high speed input combined with up to 60K buffer (more with character compression) frees up your computer from the slow job of printing. Modems and other compatible devices can also be buffered. Multiple software-selectable outputs permit you to choose between two or more VERSAbbox outputs or use them simultaneously. You can buffer multiple inputs simultaneously too. Add the optional Real Time Clock to VERSAbbox and you get a six digit LED numeric time display. Your computer can read the time via the RS-232C port. Another useful option is the switched 120V socket that can turn external devices on and off by clock control. Supplied in an attractive, compact 11" wide, 8" deep, 3" high cabinet. Interface cables are available from your dealer or Prometheus. VERSAbbox - \$249 (16K buffer). Serial version - \$299. Clock display option - \$150. Switched outlet - \$50. Additional 16K memory kits each - \$50. Prometheus Products, Inc., 45277 Fremont Blvd., Fremont, CA 94538 (415) 490-2370.

With this new **Color Ink Jet Printer**, named the OmniColor 640, any Apple II, Apple //, or IBM color display can be reproduced as a high quality color print. Special software routines are available for combining screens, selection of colors from a 64 color palette, and creating other special graphic effects. A normal screen can be dumped in less than two minutes. OmniColor is especially suited for an office environment because of its desktop size and quiet operation. The quality of ink-jet printing with large color selection and 'solid' solids makes it the only choice where quality is demanded. Without choice where quality is demanded. Without ribbon contamination, color limitations, and slow speed characteristics of matrix printers, OmniColor is ideal for presentation quality reproductions. As a plotter, it is easier to use and is much more flexible than dedicated plotters. Complete package (printer, software, hardware interface - \$4,995. For information contact: Quadram Corporation, 4357 Park Drive, Norcross, GA 30093 (404) 923-6666.

AbCom Corporation now provides **Disk Cable Jumpers** to ease your short disk drive cable problems. Connect/disconnect your disk drive outside the computer (no need to remove the cover). Avoids the need to remove the disk drive controller card. Operates with both DOS 3.2 and DOS 3.3 - \$22.95. AbCom Corporation, P. O. Box 5203, Mission Hills, CA 91345. (213) 891-3669.

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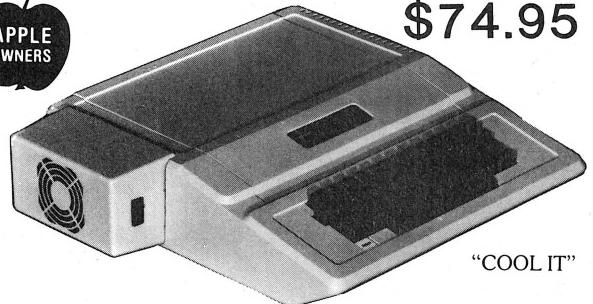


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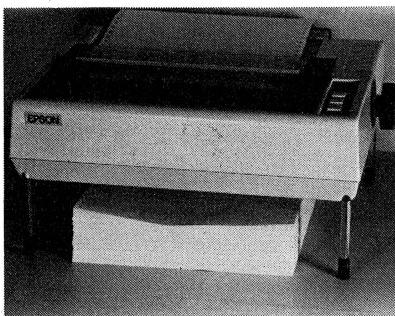
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Owners of the popular Apple II computer can now Run Programs Designed For The IBM Personal Computer using a new accessory card that plugs into the Apple computer. The 88CARD, developed and sold by Coprocessors Inc., contains an auxiliary central processing unit incorporating an Intel 8088 16-bit microprocessor plus 64 kilobytes of random access memory (RAM) and control functions. It simply plugs into a vacant slot in the Apple, turning it into a 16-bit personal computer with 128 kilobytes of memory. The 88CARD is fully compatible with Apple peripherals such as disk drives and printers, and allows immediate selection between conventional Apple operation and IBM Personal Computer programs running standard operating system software. The Coprocessor 88CARD utilizes the operating system designed for the IBM computer, and this is included with the 88CARD. The board features low power consumption, allowing it to operate from the Apple's internal power supply without overloading it. No external supply or connection is required - \$899. Coprocessors Inc., 50 West Brokaw Road, Suite 64, San Jose, CA 95110 (408) 947-4616.

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EXCEL-9 is the newest entry in 6809 Boards. Included are EXCEL-9 FLEX, a famous DOS, Assembler and Editor. Also able to use Apple DOS. An 8K versatile monitor contains 35 commands including 6809. Further, it can handle all Apple slot I/O routines. On-board programmable timer for both 6809 and 6502 systems allows printer spooling, multitasking, etc. A 50 page well documented manual is included. Other features are 64K RAM area expandable for multi-MPU operation; able to switch MPU from 6809 to 6502 and vice versa in both machine code routine and BASIC. TSC 6809 BASIC, Extended BASIC, Precompiler, SOFT/MERG, etc., are coming soon. \$399.95 at your nearest dealer or contact: ESD Labs Co., Ltd., c/o AbCom, P. O. Box 5203, Mission Hills, CA 91345.

The Sweet-Talker Voice Synthesizer allows you to add speech of unlimited vocabulary to your computer. Utilizing the Votrax SC-01A chip, you can output any message by programming individual phonemes. Comes in two versions; one plugs directly into your Apple II, the other connects to any computer with an 8-bit parallel printer port + 12 volts and + 5 volts required for parallel board. Contains 64 different phonemes accessed by a 6-bit code. Automatic and manual inflection modes. Parallel port driven or plug-in compatible with Apple II. Super text-to-speech algorithm on disk for Apple II. Makes Sweet-Talker equivalent to units 3 times the cost. On board audio amplifier is standard. Sample program on cassette with Apple II board. Sweet-Talker Apple II version - \$149; parallel version \$139; Text-to-Speech algorithm on disk for the Apple II - \$35; universal power supply - \$35. Add \$2 for shipping & handling. Micromint, Inc., 917 Midway, Woodmere, NY 11598 (800) 645-3479; in NY (516) 374-6794.

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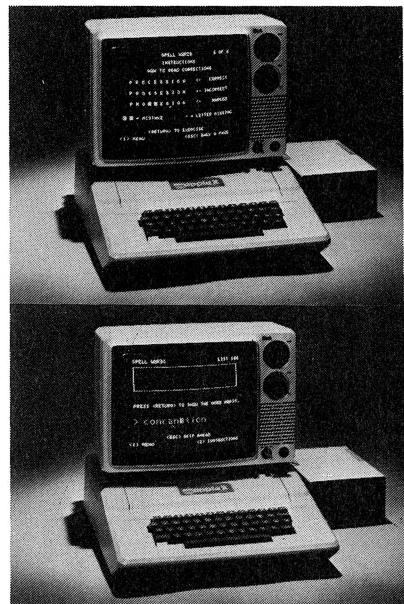
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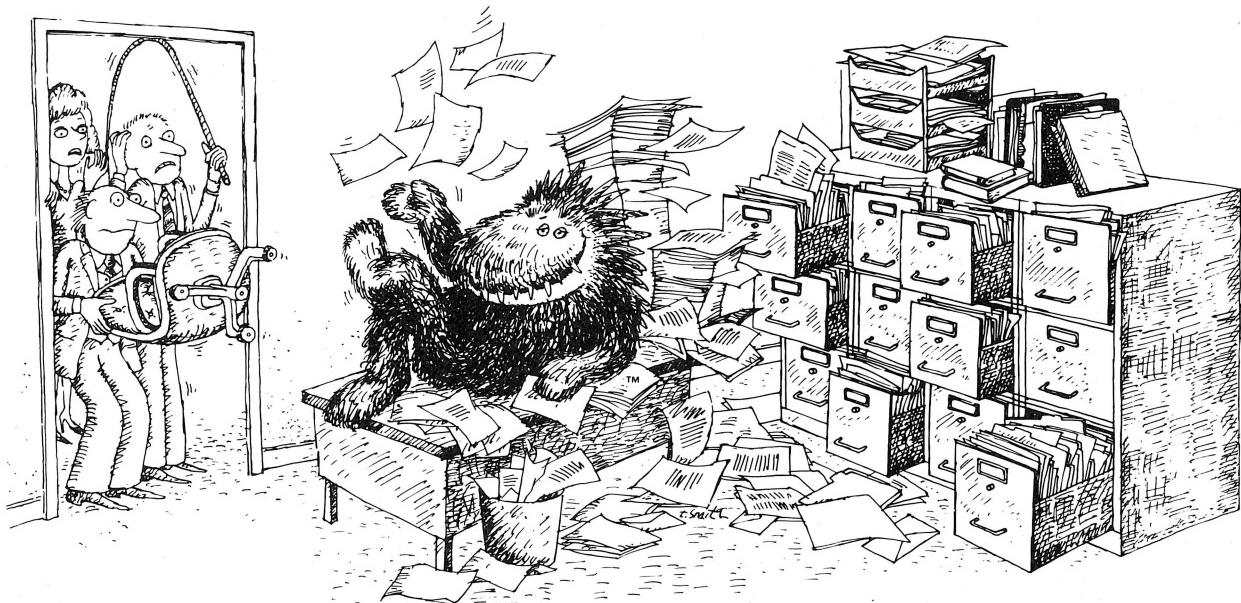
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Whole Brain Spelling is the first in a series of educational software packages from SubLOGIC. The program has been designed to help the user develop internal visualization skills for improving spelling in a manner as entertaining as it is educationally sound. It effectively utilizes the graphic and color capabilities of the Apple II Plus computer to provide positive user-feedback and to emphasize visual aspects of the learning process. The program is extremely user friendly. You can move to any lesson section as desired, choose your own word lists to study, and proceed at your own rate. A main spelling menu is accessible from any portion of the program. Lesson instruc-

tions are also always available at the touch of a key. A 2,000 word list of practice spelling words is included with Whole Brain Spelling, organized in order of increasing spelling difficulty. Study words can be printed in upper- or lower-case, in any color you choose. And each correct spelling rewards you with a rainbow of varying, multi-colored letters until the next word is selected. Supplementary word lists available in the following categories: Medical, Scientific, Secretarial, Fairy Tale, A Child's Garden of Words. Requires 48K memory and an Apple II Plus or Apple II with Applesoft in ROM (a color monitor is also recommended) - \$34.95 plus \$1.50 shipping. SubLOGIC Communications Corporation, 713 Edgebrook Drive, Champaign, IL 61820 (217) 359-8482.



High Technology Software Products, Inc., introduces **Lab Statistics Package** and **Harmonic Motion Workshop** courseware for the Apple II computer. They are the first two in a series of packages being developed by a former college Physics professor. The Lab Statistics Package, which provides an easy method of introducing students to statistical procedures used in the science lab, has a suggested retail price of \$50. The Harmonic Motion Workshop visually presents the concepts associated with harmonic motion by use of Hi-Res graphics. By using the keyboard, the student can alter such variables as the phase, amplitude, and the damping factor. It has a suggested retail price of \$75. Two more products coming soon illustrate 1) projectile motion and 2) behavior of charged particles in electric and magnetic fields. The packages require a 48K Apple with Applesoft in ROM and Disk. High Technology Software Products, Inc., P.O. Box 14665, 2201 NE 63rd, Oklahoma City, OK 73113 (405) 478-2105.



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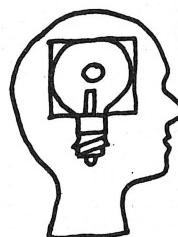
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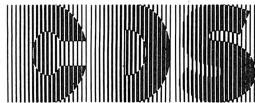
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Exec Systems announces a line of special **VisiCalc Application Templates** developed for use with Personal Software's VisiCalc. These visible templates or Visi-Temps may be used on any 48K Apple system. Each VisiTemp file is set up so that users may modify it for their specific needs, yet the Temp can save many hours of initial set up time and effort. The first four packages released by Exec Systems include VisiTemps for Income Tax Preparation, Common Business Applications, Home and Family Applications, and Sports record keeping and statistics. Available at this writing: Individual Tax Planning for 1982 Taxes - \$39.95; Common Business Applications - \$29.95; Appointment and Time Analysis Applications - \$29.15; Common Report/Analysis Formats - \$29.95; Money Market Computations - \$59.95; Home & Family Applications - \$19.95; Family Record Applications - \$19.95; Sports Applications - \$29.95.



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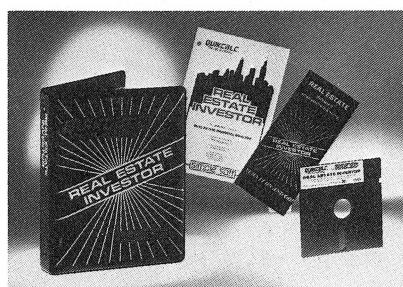


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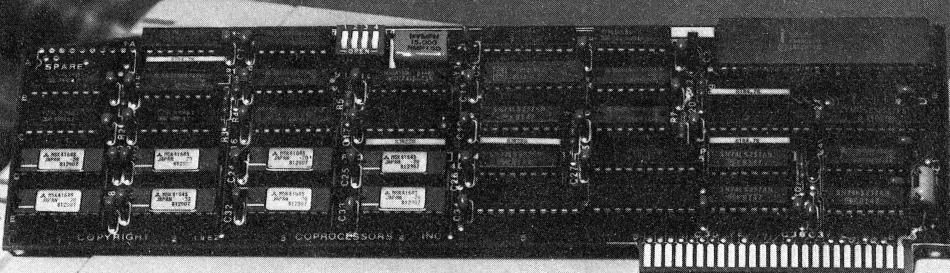
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Personal Finance Master (PFM) is a comprehensive, yet easy to use, **Financial Management System** designed expressly for personal/home and small business accounting applications. Employing easy to read 'on the screen' forms for convenient data entry and review, the system tracks and manages up to 7 different asset or liability accounts, typically including checking, savings, credit card, mortgage loan, IRA, KEOGH, and broker types. Integrating accounts into a Net Worth Statement, the system budgets and tracks expense and cash flow, reconciles bank statements, sorts expenses into tax-deductible categories, automatically records recurring transactions, handles split transactions, provides a simple year-end rollover, produces Hi-Res plots of income and expense, handles up to 700 transactions per month, provides up to 100 user-defined budget categories and will even print checks and create mailing labels. The system produces 8 CRT or printed reports graphs including Account Register, Net Worth, Search Report, Income/Expense Report, Chart of Accounts, Standard Names and Purpose Codes, Standard Addresses, and Income/Expenses vs. Time Graph. Requires an Apple II, 48K RAM, a single disk drive (DOS 3.3) and an optional printer-\$74.95. Spectrum Software, 142 Carlow, Sunnyvale, CA 94087 (408) 738 - 4389.

Big Four Accounting Package includes a General Ledger which provides immediate financial information for your company by keeping thorough records of all transactions. Accounts Receivable provides instant customer account information (current and aged) with complete invoicing and statement capabilities; Accounts Payable maintains complete vendor/voucher history, including check writing capabilities; Payroll calculates payroll for every type employee while maintaining monthly, quarterly and yearly totals for reporting purposes in multiple states, user modifiable W-2's, 941's and more. Each of the programs in the Big Four include sample data for training and demonstration purposes, complete audit trail on all transactions, comprehensive and complete self-teaching manuals, automatic prompts for creating disk backups, recovery routines for hardware failures and Master File recovery programs. Written in Microsoft BASIC 5.X and available in interpretive code requiring 51K of memory or compiled code requiring 48K of memory. Compatible on both floppy and hard disks, and the compiled version is ideal for MP/M environment. TCS Software, Inc., 3209 Fondren Road, Houston, TX 77063 (713) 977 - 7505.

The (VisiCalc) Consolidator operates on VisiCalc files to link them together and allow manipulation of totals - without requiring the user to reenter information. For example, The Consolidator will total the results of four weekly reports to get monthly results, add three months for a quarterly report, twelve for the year, etc., using only information that has already been entered and saved. A substantial reduction of manual calculation and keyboard time can result. The new program will also print out VisiCalc commands, formulas, and the locations to which they apply. It will handle any matrix size, column widths, rows and columns that can be accommodated on the user's Apple. Its similar prompts, options and formats make it easy to use by the VisiCalc owner-\$49.95. Omega MicroWare, Inc., 222 S. Riverside Plaza, Chicago, IL 60606 (312) 648 - 4844.

MatheMagic is a unique **Number Processing System** with universal appeal and almost unlimited practical application. MatheMagic is not a 'spreadsheet'. MatheMagic can provide the answers to mathematical questions in the business world, in engineering and science, in the classroom and in the home. Menu-driven format allows rapid learning and consistent ease of use. Features on-line 'HELP' for every MatheMagic command and option, a hardware/software configuration segment to allow full use of your system's facilities, separate formula and variable storage for up to 9 users on a single disk, fixed or floating point with internal 16-digit precision, free-form entry of expressions up to 240 characters, including standard math operators, parentheses, stored variables and formulas and built-in math functions, availability of up to six levels of nesting of formulas within formulas. Also provides user-defined formulas, disk storage and retrieval of user-defined formulas by name, user-defined variables and values, retention of variable values for use in chain calculations, formulas calculated in their entirety or step-by-step with interim results, easy display and editing of all current variables, selective deletion of variables and values from memory, hex-to-decimal and decimal-to-hex conversions, full hard-copy support, including selected data printing and trace function, comprehensive user reference manual which provides a tutorial on number formats and mathematical terminology as well as documenting the product. Includes predefined mathematical functions: ABS, SQR, LOG, LGN, HEX, SIN, COS, TAN, COT, SEC, RAD. Requires a Z-80 Based Microcomputer with 64K and CP/M 2.2 or later or MP/M with at least one floppy disk drive and optional printer. For information contact: International Software Marketing, Suite 421, University Building, 120 E. Washington Street, Syracuse, NY 13202.

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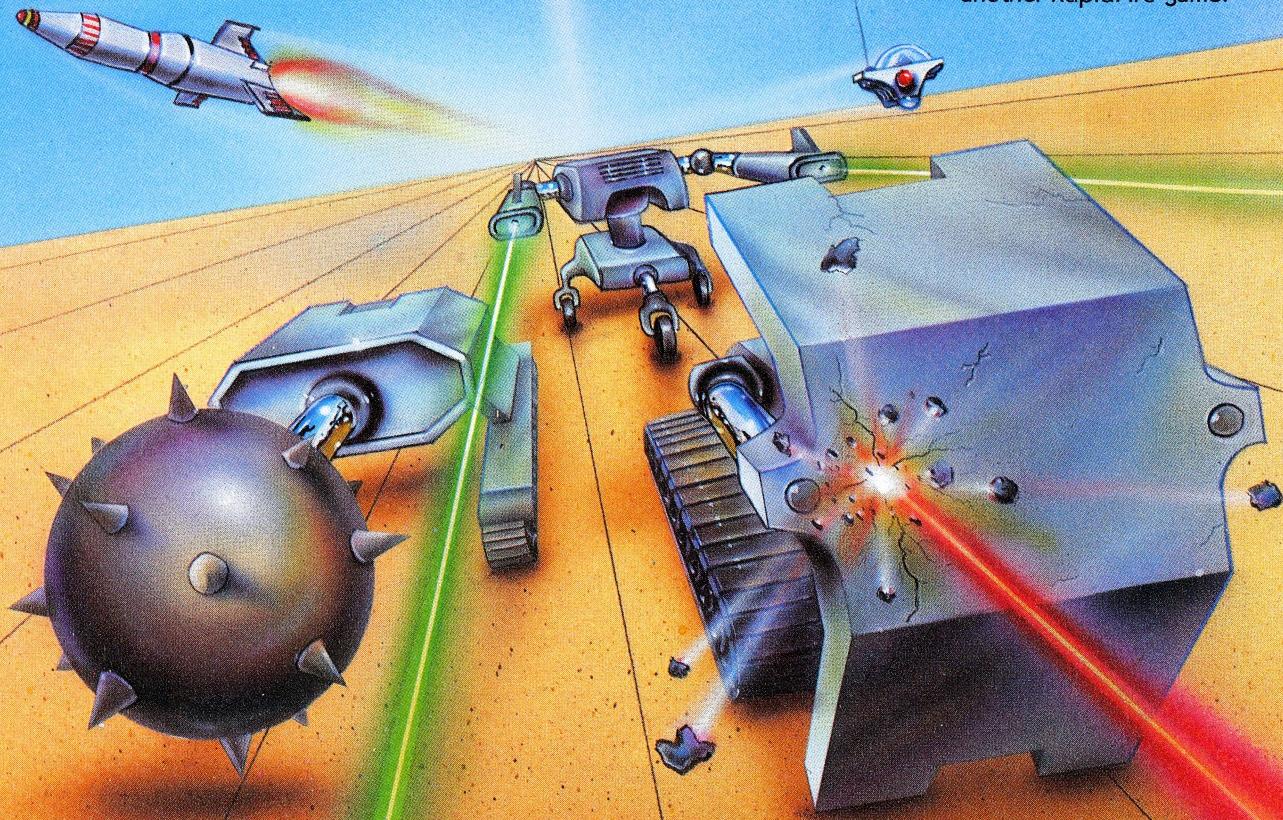
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H & H Scientific announces the release of their **Stock Option Analysis Program** featuring a full Dow Jones interface for the Apple II or II Plus. The Black-Scholes model is used to calculate the fair prices of options. The expected profit or loss on transactions involving up to three classes of Put and/or Call options can be calculated for any time until the options expire. While both the stock and option prices can be obtained automatically from Dow Jones, the program can also be run manually by entering all required input from the keyboard. Other features include user specified commission schedules, option to print output including Hi-Res graphics, and machine language sections for enhanced speed. Introductory price: \$250. H & H Scientific, 13507 Pendleton St., Ft. Washington, MD 20744 (301) 292-3100.

Designed with consultation from bankers and legal office managers, this **Trust Account Management System** incorporates all of the principles of basic trust account management into a simple, yet powerful office accounting tool. It expands on these basic principles to give the user instant access to often-requested data such as client trust balances and audit trails for individual client accounts or entire trust accounts. As an additional feature, C. C. S. has provided a function in this system which will automatically trans-

fer funds from any Trust System account into a client account in the Professional Timekeeping System, making this System a perfect complement to that already powerful legal office management system. Functions include entering deposits and withdrawals, printing withdrawal checks and account transactions, void entries, analyzing an entire trust account, reconciling monthly bank statement, purging existing account, changing system parameters, etc. Handles one trust account per disk - will accommodate any number of accounts. Requires Apple II Plus, 48K, DOS 3.3, two disk drives and printer. For information contact: Computer Consulting Services, 1376 Cleveland Street, Clearwater, FL 33515 (813) 441-3490.

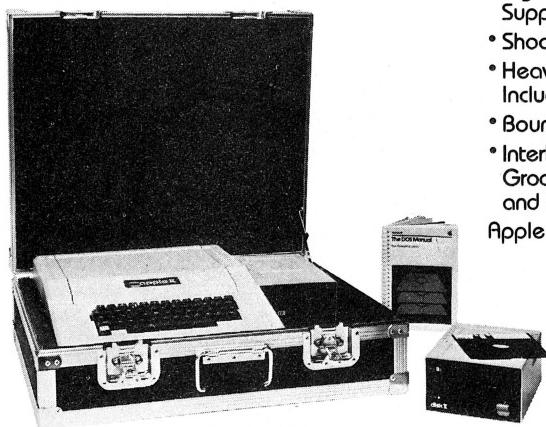
Trickshot is a high resolution color simulation of a game of billiards allowing precision ball placement capability and accurate aiming. Trickshot features trick shot examples, four new games, disk storage of shots, and more. Allows control of friction, speed; other features. Requires 48K, Disk - \$39.95. Innovative Design Software, Inc., P. O. Box 1658, Las Cruces, NM 88004 (505) 522-7373.

Deadline - you are about to investigate one of the deadliest plots in the annals of crime. A locked door; a dead man; and 12 hours to solve the murder. That's where you begin. Ahead of you, a treacherous web of motives and suspicion. And only by bringing your utmost skills of logic and intuition into play can you successfully solve the case. Working from a complete dossier on the crime and the myriad clues along the trail, you'll find yourself becoming totally immersed in the investigation. Every scrap of evidence, every lead, every turn of events is far too realistic for *Deadline* to be considered a 'game' or 'fantasy'. And its degree of interactiveness is so highly advanced that, for the first time in the genre, the characters actually possess independent, flesh-and-blood personalities. In fact, they're so free of your control that should you make the wrong move, one of them may do you in! At your local dealer or contact: Infocom, 55 Wheeler Street, Cambridge, MA 92138.

GAMES/SIMULATIONS

Juggler is a fast, exciting high resolution game in which you test your juggling skills against your Apple II. Presents arcade quality color graphics with realistically smooth motion. You will find Juggler an addictive and challenging game which will keep you juggling for hours of fun and enjoyment. Requires 48K, Disk - \$29.95. Innovative Design Software, Inc., P. O. Box 1658, Las Cruces, NM 88004 (505) 522-7373.

Choplifter gives Apple owners a mission to rescue hostages from behind enemy lines. Take control of a helicopter in this new arcade-style game. With realistic throttle action players can maneuver their helicopter through a sky of enemy jet fighters and air mines in HiRes and simulated 3-D. Once you have successfully landed your chopper, hostages will run toward you through a barrage of tank fire and air to ground missiles while you frantically try to hold off the enemy. Each flight back to safety is especially nerve wracking, as a full load of hostages will perish if you go down! Choplifter is \$34.95. For the Apple II or II Plus, 48K, DOS 3.2 or 3.3 and joystick with two buttons. Broderbund Software, Inc., 1938 Fourth Street, San Rafael, CA 94901 (415) 456-6424.



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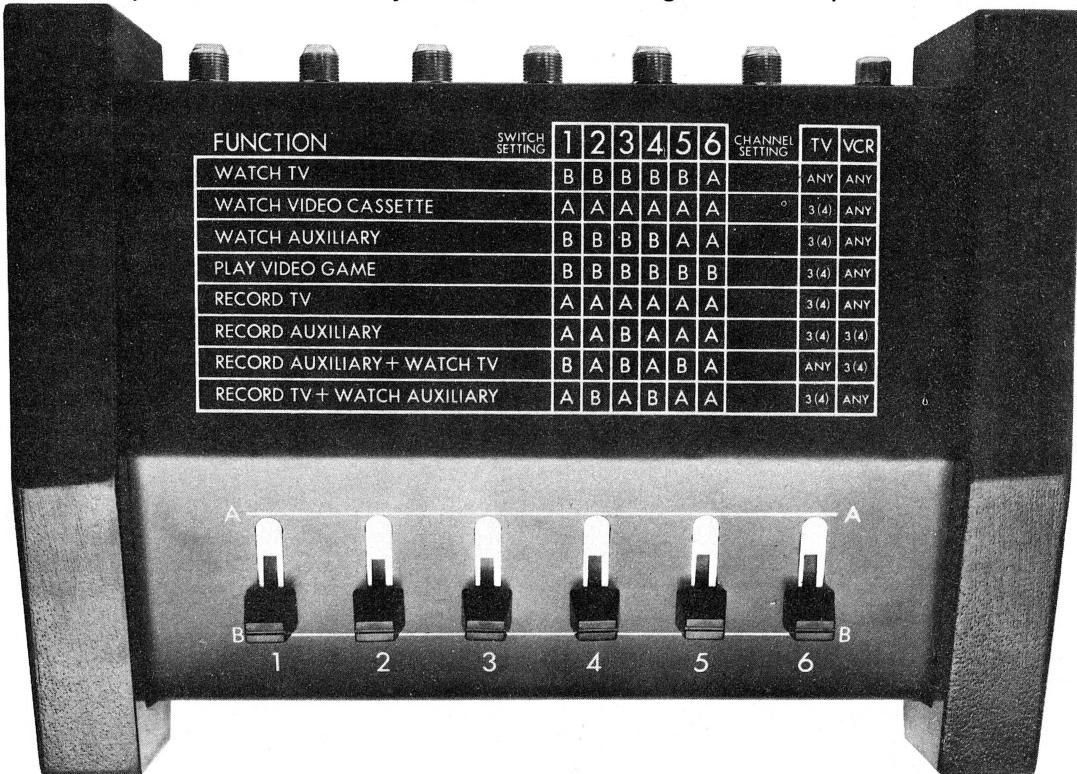
CASES, INC. P.O. Box 33820 Seattle, WA 98133 (206) 365-5210

Pinball simulation for the Apple II is based on a WWII night bombing mission. The look and sound of a real pinball table has been recreated down to the finest detail. The smallest characters and labels are plotted on 3 x 4 matrices. The playfield has five bumpers, seven standup targets, nine rollovers, two spinners, and much more. Interlaced sound technology enhances the realism and excitement of play. Under the right conditions a ball can be trapped in the dive bomb chute and an extra ball will be given. Up to four balls can be in play simultaneously. Releasing any

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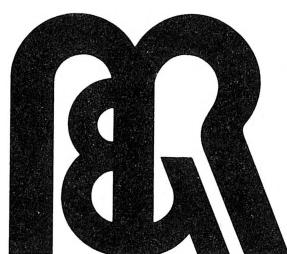
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captured balls is simply a matter of dropping the ABCD standup targets or draining the ball in play. Offers ten user-selectable modes of play and gives control over forty parameters which are all user-adjustable including balls per game, forward incline, spinner friction, tilt effect, ball trails, ball speed, sound, bumper impulse, drone sound, flipper power, etc. Requires an Apple II with 48K memory - paddles are recommended but not necessary - \$29.95 plus \$1.50 shipping. SubLOGIC Communications Corp., 713 Edgebrook Drive, Champaign, IL 61820 (217) 359-8482.



Cuban Fantasy is a quick, colorful and entertaining simulation of Rubik's Cube for Apple computers. A six color graphic display, random mixing to create a puzzle, consecutive moves (over 100 moves at once), and the ability to save the current

cube for later recall are featured. The *Cuban Fantasy* program is self-documenting and requires 48K, DOS 3.3 and Applesoft - \$14.95. Yukon Computer Products, Inc., P. O. Box 37088, Minneapolis, MN 55431.

Labyrinth. Beneath the City of Euqubud on the famed Ippississim river lie Prince Julian's mines - a labyrinth of hundreds of miles of tunnels and caves which was once the richest source of diamonds in the world. The mines are closed now. The yield became too meager and the cost too great, or so they said. Many men believe otherwise, and rumors abound of mysterious and terrifying creatures of the dark caverns which chased Prince Julian's company from the mines and now jealously guard their riches. Many courageous adventurers have ventured back into the deep seeking the fortune they believe to be there, but none has returned. They learned too late the terrifying secret of the Labyrinth which ensures the doom of even the best prepared explorer - the walls of the mine are in constant motion, exposing entryways and sealing off exits, as its ghastly guardians render useless both map and compass with their evil engineering. An arcade-style game for the Apple II or II Plus with 48K, 13 or 16 sector disk drive, keyboard and joystick control. \$29.95 at your local dealer or contact Broderbund Software, 1938 Fourth

Street, San Rafael, CA 94901 (415) 456-6424.

Voyager Software has introduced **Starship Commander**, a complex strategic space-battle simulation featuring 30 Hi-Res color displays for the Apple II. As commander of the *U.S.S. Ranger*, a player must locate and destroy combinations of enemy destroyers, cruisers, and dreadnaughts using more than 40 commands and 100 options to manage the crew, maintain power, maneuver the ship, make repairs, fire weapons, and communicate with the enemy. A special feature of the game allows a player to send and receive messages from the enemy. Another special feature of the game is that the crew of 120 men and women are assignable by name to each of three shifts. The ship also has 50 droids. Each of the ship's seven stations - Engineering, Science, Weapons, Defense, Communications, Life Support, and Navigation - has its own display and command console. For improved playability all commands are entered by paddle - the keyboard is not used after the game begins. A player can use either manual, semi, or fully automatic systems control. The game includes a 'save' feature - \$49.95. Requires Apple II with 48K, DOS 3.3 and paddle. Voyager Software, P. O. Box 1126, San Francisco, CA 94115 (415) 387-0285.

WATCH OUT. The OINKS are loose!



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Pig out on fun with **PIG PEN**

(for the Apple II* and the IBM-PC!)

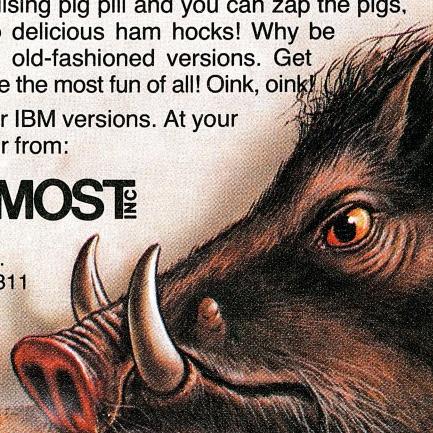
Here's the newest and freshest idea in dot-maze games. You'll go hog-wild at the way Pig Pen's clever switches make this the most intriguing game you ever got hooked on!

With Pig Pen you run the maze leaving dots wherever you go! And the 4 beady eyed pigs are out to stop you. Take a potent, pulsing pig pill and you can zap the pigs, turning them into delicious ham hocks! Why be 'boared' with the old-fashioned versions. Get the freshest - have the most fun of all! Oink, oink!

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Dueling Digits. The human race is in a dark age, and the art and science of math is but one of many which are lost, though not entirely forgotten. A place deep in the blasted sands of the San Francisco desert is said to hold those ancient secrets, a place called 'The Temple of Numbers'. People of this future age consider numbers sacred. Using the machines left to them by their ancestors, they struggle for the ultimate spiritual discipline... the 'balanced' expression. The human species, long afflicted with a genetic propensity to devalue its strongest asset, the brain, now looks to institute an age of reason based upon mathematical certainty. The program is an arcade-style game requiring you to shoot and capture numbers and mathematical operands and place them on the temple floor in such a way that they form a balanced mathematical expression. *Dueling Digits* is enjoyable for players from age 8 to 80. The program requires paddles or joystick, a 48K Apple II or II Plus, 13 or 16 sector disk drive. \$29.95 at your local dealer or contact: Broderbund Software, 1938 Fourth Street, San Rafael, CA 94901 (415) 456-6424.

It's not enough that the gangs of space **Bandits** will steal all of your supplies, they want to kill you too! And they have dozens of devious ways to get the dastardly deed done. There's heat seeking bullets, napalm bombs and bouncing nerve gas balloons - all dropped for one purpose - to send you packing to the pearly gates while the bandits make off with the lunar loot. Use your laser gun and protective energy shield to blow those greedy galactic gangsters to bits. It's you or them! Good luck, Pilgrim! *Bandits* is \$35.95 at your local dealer or contact Sirius Software, 10364 Rockingham Drive, Sacramento, CA 95827. (916) 366-1195.

Fly Wars has spiders spinning intricate webs of purple energy then, one by one, ensnaring and destroying the Flies. But then, the lifeless remains of the Fly-Fighters regenerate into Caterpillars, armed with ray guns. They then turn into explosive cocoons and the Spider-Fighter just shoves them off the edge of the web. When the Black-hearted Beetles join the dark side they pinch through the energy web releasing the trapped Fly-Fighters. Next, the Raygunites' ultimate weapon, Bug Spray, was brought against the Spider. This deadly spray was known to wilt even the most valiant of arachnids. Written by Duane Later in Assembly language, *Fly Wars* is playable with keyboard, or Atari-type joysticks connected to Sirius Software's Joyport. *Fly Wars* requires an Apple II or II Plus computer with 48K and Apple disk drive. At your local dealer or contact: Sirius Software, Inc., 10364 Rockingham Drive, Sacramento, CA 95827 (916) 366-1195.

Alkemstone Adventure offers a \$7,500 cash reward to the first person who can recover the missing Alkemstone. The quest for the Alkemstone will lead the player through underground paths of the lair of the original owner. There are unusual messages, fragments of words, sketches and other clues written on the walls. Some items are distributed randomly, so that one may be visible numerous times while some will only appear once in several trips. Each trip will result in a different combination of possible hints. If all bits of information are pieced together correctly, then the location of the Alkemstone will be obvious - \$39.95. Level-10, 7475 Dakin St., Denver, CO 80221.

GENERAL BUSINESS

Milestone is a powerful **Critical Path Planning** program that can be used for planning and analyzing virtually any project, from the opening of a retail store to drawing up a cost estimate for a construction project. The applications are endless. Once the working days, skill categories, wages or salaries and time increments are

defined, then Milestone is ready to do the work for you. Change, for instance, the estimated completion date of a particular time-critical task, and you'll instantly see its effect on the entire project. All scheduling, manpower costs, associated reports, etc., are immediately re-tabulated. A calendar display allows you visually to follow the activities (200 per project with 64K RAM, up to 400 with 128K RAM. Examples are included on the disk - \$295, Milestone-86 version is \$395. Requires 56K RAM and CP/M. Digital Marketing, 2670 Cherry Lane, Walnut Creek, CA 94596 (415) 938-2880.

Marathon Microsystems, Inc. has gathered and tested a large array of **Farm Software**. They carry a variety of accounting, dairy, hog, cash crop, and simulation programs designed specifically for farmers, and many of them were written by farmers. Software is currently available for Apple, Radio Shack, and CP/M computers. For a price list and details on any of the programs, contact MMI, 2610 Grant Street, Evanston, IL 60201. (312) 864-6289.

The Control and Automation Group of the Department of Electrical Engineering of Twente University of Technology has developed THTSIM to **Simulate Dynamic Systems** on a small computer system. Using THTSIM the dynamic system will be

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simulated in an interactive way with graphic output for fast interpretation. Even when the computer is simulating, interrupt is possible permitting the user to check values or change the model. The model may be specified in block diagram form or in bondgraphs. Includes about 40 analog, logic and dynamic functions, including non-linear, PID-regulator, Sample/Hold, function generator. Features about 15 bondgraph functions, including differential buffers in order to solve causality problems. Uses floating point arithmetic, frequency analysis by FFT, parameter estimation by SIMPLEX algorithm. For more information contact: Twente University of Technology, Control and Automation Group, P. O. Box 217, 500 AE Enschede, The Netherlands.

The Legend **Slide Select** program is a combination of two pieces of software, designed to allow the user to retrieve a Hi-Res picture very rapidly. One is an Applesoft program that allows easy control of Hi-Res pictures. Also, for the BASIC programmer, a machine language interface is available to allow easy access to the Legend Cards. For the non-programmer, Legend Slide Select offers an easy way to display Hi-Res pictures. The result is the functional equivalent of a slide projector, allowing the user to flip forward or backward. Control of the displayed pictures is user selectable and can be controlled from the keyboard, from the game paddles, or can be set to run automatically. Up to 8 pictures can be stored in a Legend 64KC card, or 16 pictures in a Legend 128KDE (or 16 with 2 64KC's, 32 with 2 128KDE's, 24 with a 64KC and a 128KDE, and so on). The Legend Slide Select is a very flexible program, for demonstrations and displays. At your local dealer or contact: Legend Industries, Ltd., 2220 Scott Lake Road, Pontiac, MI 48054 (313) 674-0953.

P. A. C. E. is a very flexible general-purpose **Cost Estimator** suitable for any repetitive unit cost estimating. Businesses such as general contracting, sub-contracting, and manufacturing can use this software package to reduce estimating time and produce more accurate estimates. Each estimate may consist of up to 400 categories derived from up to 400 cost items, all definable by the user and stored on diskette for repetitive use. P. A. C. E. allows up to 100 estimates per diskette, will flag outdated costs, and is capable of single and double-quantity calculations. Reports provided include: Current Cost Report, Estimate Takeoff Sheet, Summary Estimate Report, Detail Estimate Report, Unit Cost Report, and Current Estimate Report. This product will be offered at a suggested retail price of \$395 and requires a 48K Apple II with the Apple Pascal system, three disk drives,

and a printer with interface. Contact your local computer dealer or High Technology Software Products, Inc., P. O. Box 14665, Oklahoma City, OK, 73113 (405) 478-2105.

SYSTEM II EX is a fully **Integrated Accounting System** with Chart of Accounts, Inventory, Vendor File, Customer File, Accounts Payable, Accounts Receivable, General Ledger & General Journal, Payroll, and Database with a file manager. Job Costing, Cycle Billing, Order Entry, and Analysis are optional modules that are also available and are interactive with the system. The system uses a Keyed Sequential Access Method (KSAM) firmware card that plugs into a slot in the Apple to permit high speed searches on the key field. It also eliminates sorts after entry as all records are sorted upon entry. The KSAM card maintains all files in ascending order on the first field in every file. Two-second access is guaranteed for any record accessed on the first field for the 5 1/4" system. Slightly longer access time may be experienced on the Corvus hard disk drive, due to the number of files that can be accessed. System utilities include Full Disk Copy, File Copy, Memory Test, Disk Speed Analyzer, KSAM card test. Operates with 5 or 10 megabyte Corvus drive. SYSTEMS II -EX - \$1495. Modules available separately from \$295 to \$545. Westware Software, Inc., 2455 SW 4th Ave., Suite 2, Ontario, OR 97914 (503) 881-1477.

BIBLIOTEK Version 2.0 is a complete software system tailored for **Personal Reference File Maintenance** of scientific and academic literature citations. Complete citations for publications appearing in journals (abstracts, supplements and translations), books (monographs, annuals, edited volumes and indices), and conference works (proceedings, symposia and transactions) are supported. The BIBLIOTEK software system automates the entire process of bibliography management from citation entry through printing a finished reference list. The benefit to the user is not only a significant time saving, but the assurance that a critical reference has not been misplaced or forgotten. Citation entry, modification, deletion, searching, sorting and printing are all controlled through simple prompted keyboard entries. Extensive facilities are provided for editing and altering responses to aid in the process. Approximately 500 references can be accommodated in a single bibliography (which consists of two diskettes) with the basic system. Any number of these bibliographies may be maintained. Searches may be made by key word, source title, author/editor names, title phrases and dates in any combination. The list resulting from a search may be further edited

and sorted before printing in publication ready form. The system is simple to learn and simple to use, yet pushes the Apple II to its limits in order to provide the most flexible and powerful system possible. An extensive reference manual (approximately 150 pages) provides details of the BIBLIOTEK system. Requires Apple II with 48K, Applesoft ROM, two disk drives and a printer. Single user license is \$300. Scientific Software Products, Inc., 3171 Donald Avenue, Indianapolis, IN 46224 (317) 299-0467.

Time is money, and AccuRec turns an Apple II into an advanced **Attendance Recorder/Reporting System** that offers more features than units costing \$3,000 and more. Employees simply enter their personal ID codes to record their in/out/times. AccuRec generates a printout (upon command) of the employees' daily/weekly/total hours and gross pay (including overtime wages). Each payday, AccuRec saves valuable administrative time and costly errors by eliminating the time-consuming process of converting time cards into payroll data. AccuRec can be used in conjunction with existing payroll software, integrating time recording and payroll preparation. Other features include the display of daily/weekly records on all employees for quick reference and monitoring. If an employee forgets to clock in/out, AccuRec requests that the information be entered manually. Structure the workweek, paydays, overtime rate multipliers, and when overtime benefits begin. AccuRec also functions as a job cost recorder. It records the start and finish times of various projects, and automatically computes those job costs. Requires a 48K Apple II, single disk drive, time clock board, and operates on most printers - \$179.95. Individualized Operand, P. O. Box 3030, San Rafael, CA 94912 (415) 459-3383.

This package is designed for the single practitioner or small **Medical Office**. Functions included in the package are appointment scheduling, private patient billing, and third party universal claims form preparation. The menu driven package is designed to be user friendly and comes with a new training and operations manual. Requires an Apple II or II Plus with Applesoft ROM and two to four disk drives, 48K of memory and a 130 column printer - \$795.95. Charles Mann & Associates, Micro Computer Division, 55722 Santa Fe Trail, Yucca Valley, CA 92284 (714) 365-9718.

New microcomputer software is available to store and **Analyze Weather Observations** from your home, farm, school, or local airport station. It allows simple entry of daily temperatures and precipitation amounts which are stored, then sum-

marized. Routines in the software produce tables and graphs showing accumulated excesses or deficits, departures from normal, and extremes observed, etc. Current weather can be compared with that of any year since 1951 utilizing data from the user's local area contained in the software package. The data base is continually updated as owners add their observations. The system requires one disk drive and an Apple II Plus with 48K RAM or the Apple /// - \$59.95. A maximum-minimum thermometer and rain gauge are also available for anyone who wishes to purchase them with their software. Contact Climate Assessment Technology, Inc., 11550 Fuqua Street, Suite 355, Houston, TX 77034 (713) 484-3603.

The Bowling League Data System is designed to store and compute data for multiple and/or mixed) leagues of up to 40 teams each with up to six bowlers per team (not including substitutes). For each team a cumulative record is kept of total pins, games won and lost, total points, high series, etc. Similar information also is maintained for each bowler, as well as high game, handicap and other data. The reports generated by the system are: Weekly Recap Report, Score Sheet, Season Average, and Team Listing. The score sheets to be used for the following week are automatically generated with team and lane pairings. Many options are included. Data for an entire season can be stored on a single disk (per league). Corrections are easily made. Requires Apple II with 48K, Applesoft ROM, and disk drive (two recommended) with DOS 3.3 and an 80-column printer - \$149.95. Rainbow Computing, 19517 Business Center Drive, Northridge, CA 91324 (213) 349-0300.

This new package is designed for the medium sized Group Medical Practice or the heavy volume single practitioner office. Features included in the package are appointment scheduling, dental records management, private account billing, accounts receivable management, and ADA claim form preparation. The appointment scheduling element allows entry of new patients to the system, setting of future appointments, preparation of printed appointment schedules and automatic preparation of checkup reminder notices. The system is designed to replace the paper appointment book with a fast computer based scheduling system. The dental records system allows for the design of magnetic or paper forms which can be used to record dental treatment requirements, record actual dental work accomplished, prepare dental insurance pre-authorizations, and handle dental records transmittal to other dentists or specialists. The system in-

cludes a mailing list capability useful for such normal activities as general correspondence or birthday card addressing. The complete private patient billing system prepares a daily record of transactions and provides a management summary of fee productivity. Monthly billing can be rapidly posted and printed and an aged accounts receivable report is available upon demand. Patients having dental insurance will automatically have their insurance forms prepared by the system or they may use the system's special dental insurance short form claim. Requires an Apple II or II Plus with Applesoft ROM, 48K of memory, two to four disk drives and a 130 column printer. Additional information may be obtained from Charles Mann & Associates, Micro Computer Division, 55722 Santa Fe Trail, Yucca Valley, CA 92284 (714) 365-9718.

This is a powerful **Data Base System For Physicians and Dentists**. It consists of thirteen programs in which office and personal information can be entered, deleted, changed, sorted, searched and printed in multiple formats - all at the touch of a button. Features include: Appointments listing by day and hour of office and personal schedule, important dates, and times. Prints out day sheets and other reports. Also contains a listing of patients, addresses, phone, payments, etc. with labels, billing, recall and collec-

tion options. A 'Dead Beat' file lists your most unpopular patients for collection, suits, and no further appointments. Provides Phone Lists, Insurance Lists, Stock and Supply Inventory, a check file of expenses and income, a list of stocks, bonds and other investments, profits and losses. Employee records provides a file of staff, their addresses, phones, salaries, etc. Subscription index catalogs many periodicals, costs, and renewal dates. System also provides a powerful letter writing program for reports, papers, patient notes, etc., a mailing list, file transfer disk-to-disk or by modem. Requires Apple II with Applesoft ROM with 48K RAM, one disk drive and optional printer. Diskette is not protected - \$150. Adept, Inc., 1000 North Avenue, Waukegan, IL 60085 (312) 244-0292.

COMPUMED is a complete **Patient Management System** that has been tested for over ten months in doctors' offices to prove its ease of use and manageability. This program will produce all the informational reports that any doctor would need to increase the efficiency within his office. COMPUMED is a menu driven program that was designed for the person who has had no formal training in computers, so that it would be easily understood and easy to operate. Prints health insurance claim forms, accounts listings, service analysis, and

What would you give to have your Apple II able to configure to any peripheral?



SOTech
MICROSYSTEMS

many more. COMPUIMED has a lower price than any other medical management program of its caliber on the market today. For information contact: Progressive Data Intelligence, Inc., Plaza 7000 Building, Suite B230, 7000 S.W. 62nd Avenue, South Miami, FL 33143 (305) 665 - 9465.

With **Linear Programming Optimiser** you can establish the optimum mix of your resources. The beauty of the system is that you don't have to understand computers, programming or mathematics. Each package includes a unique Tutorial Manual which assumes you know nothing about computers or Linear Programming. The tutorial takes you through problems step by step using your machine as a teaching aid. As you work through the examples you learn how to use Optimiser and how to formulate your own problems. And if you are already a computer and LP buff, you simply skip the Tutorial and go straight to the user Reference Manual. If you already use a spread sheet system you will find the Optimiser's display screen very familiar. Provides for up to 2,000 elements and uses the proven Simplex method. The matrix allows you to vary the number of variables and constraints to suit your needs. You can display problems in brief and produce interim reports. You can produce a full Sensitivity Analysis of the Margins and Objective Function. You can look at cost ranging and shadow pricing. You can store problems and recompute them with different variations. Requires Apple II with Applesoft, disk drive and a printer. At your local dealer or contact: Caston Software Publishing Co., Ltd., Lading House, 10-14 Bedford Street, Covent Garden, London WC2 9HE.

Dentistaid is designed to streamline all major time-consuming tasks performed in the **Dental Office**. This menu-oriented program will automatically print standard ADA insurance forms, prequalification and actual services, monthly statements, patient recall notices, accounts receivable aging reports, daily summary of work performed and payments received, daily, weekly, monthly, and yearly totals, production analysis using standard ADA categories and display of individual accounts. This error-free, operator-proof program can be installed in a dental office in two days. One of the primary advantages of Dentistaid is the simplicity of operation used to increase office efficiency through automatic generation of many forms and reports that give the dentist better practice control. Requires Apple II, Z-80 card, 48K RAM, 40 or 80 column video display, serial 132 column printer, and three disk drives. For information contact: Hayden Book Company, Inc., 50 Essex Street, Rochelle Park, NJ 07662 (201) 843 - 0550.

GRAPHICS

Accu-Shapes is the one-of-a-kind, ultimate **Shape Builder**. Create shapes in Lo-Res with magnified detail, view them in high resolution and color. Transfer them back to Lo-Res for further editing. Page through a table as if thumbing through a book. Add, delete, and combine shapes from several tables to form new tables. The advanced programmer or the beginner can design a library of character sets, special graphic symbols and shapes for animation. Written in fast Assembly language. Requires 48K, ROM Applesoft, DOS 3.3 - \$49.49. Accent Software, 3750 Wright Place, Palo Alto, CA 94306 (415) 856 - 6505.

The **Portrait Subsystem** allows Apple II owners to create computer portraits that may be heat transferred to create customized T-shirts, posters, and other novelty items. The Portrait Subsystem is now available for fun or profit. The composed digitized picture may be frozen on the screen at any time to view the finished result. The picture may also be saved to disk if desired. The portrait software allows the digitized picture to be dumped to the printer by simply pressing the 'P' key for print. Prior to printing, the entire image is reversed on the screen so as to print a 'mirror image' suitable for heat transfer. The printed picture is approximately 9 1/2 by 8 inches. The entire Portrait Subsystem includes the Ditherizer II with video camera for input, the Station Master printer interface card with cable, Portrait software, and starter supply set including special ribbons. Requires a 48K Apple II with Applesoft, one disk drive, game paddles, at least one monitor (two are recommended), and either an Epson MX-80 printer with graphics option, or Centronics 739 printer. The Portrait Subsystem - \$1,175. Computer Station, 11610 Page Service Drive, St. Louis, MO 63414 (314) 432 - 7019.



This new **Graphics Card** allows Apple users to have full graphic capability at lower cost than other popular graphics cards. Features choice of Hi-Res Page 1 or 2, inverse, double size, vertical or horizontal orientation, centering, block

graphics, bell control, margins, perf skipping, variable line length, and text screen dump. Comes complete with an 8-foot round cable, - \$159. For information contact: Quadram Corporation, 4357 Park Drive, Norcross, GA 30093 (404) 923 - 6666.

The Apple Flasher is a powerful **Graphics Display** software package used to locate and display standard Apple II Hi-Res graphic files from DOS 3.3 disks. The program bypasses ordinary DOS routines to display files as pictures in about 1.5 seconds each. Display modes include: (1) single key selection of any files on disc, (2) continuous scan of all files on disk with new picture on screen every 1.5 seconds, (3) carousel projector simulation controlled by either of the game controllers (or the keyboard) to display screens from 1 or 2 drives with instant access to both next and previous 'slide', (4) and continuous display of all screens on 1 or 2 drives (up to 30 pictures) with individual control of display time for each picture as used in advertising displays, etc. Unlabeled disks may be searched for presence and names of high resolution screen files with 2 key strokes per disk at the rate of 5 to 10 seconds per disk. Requires Apple II Plus (or Apple II with ROM or Language Card Applesoft), 1 or 2 disk drives, and DOS 3.3. Game controllers for projector simulation optional. Crow Ridge Associates, P. O. Box 90, New Scotland, NY 12127 (518) 765 - 3620.

GraFORTH is the ideal **Graphics Programming Language** for entertainment, educational, and other graphics software creation. Designed for novices and professionals alike, GraFORTH features fast 3-D color animation graphics including rotation, scale, transposition, and perspective. Character set graphics are also included with full color, variable character sizes, upper and lower case text entry, and a unique block print command for easy manipulation of large shapes. Lines are drawn much faster than in BASIC and colored lines are never broken. Turtle-graphics are included to rapidly draw line shapes at any angle. Further, GraFORTH has a sophisticated software-based music synthesizer for adding music or sound effects to your programs. Music can be played in any one of several possible instrument voices. GraFORTH is highly structured, providing easy-to-read code and programs that are fully compiled to machine language for ultra fast, smooth execution. A 220-page tutorial manual provides complete descriptions of the program's operation for the first time user and is an excellent reference tool for the more experienced programmer. Requires 48K RAM, DOS 3.3 and recommended is a 16K RAM card. - \$75. Insoft, 10175 S.W. Barbur Blvd., Suite 202B, Portland, OR 97219. (503) 244 - 4181.

With Video Loom II and an Apple II Plus personal computer, a weaver can **Simulate a Handloom Design** and see a Hi-Res color picture of the resultant textile in seconds. The program is easy to use. No computer experience is required. The computer, via a TV screen, asks the weaver for information about how the 'loom' is to be set up, what colors are to be used, yarn sizes, treadling order, etc. The weaver responds by typing answers on an ordinary typewriter keyboard. Once the loom is 'warped' and the weaving sequence established, the computer draws a full color television picture of the design. The designs can be saved on small, inexpensive (and reusable) magnetic diskettes. Of course, the design images can easily be photographed if color slides or Polaroid pictures are desired. Features fast machine language routines for weaving and drawing, and a fool-proof screen editor for setting up the loom. Simulates a 32 harness loom with 64 treadles. Designs can be displayed in up to six colors (including black and white). In addition to choosing a threading draft, tieup and treadling, the program allows the weaver to vary warp and weft colors, thicknesses and the spacing between threads. This makes it possible to create design images that look very much like photographs of woven textiles. Hardcopy printout of the draft, tieup, treadling and all other design elements are available. Requires a 48K Apple II or II Plus with Applesoft in ROM or a Language Card and DOS 3.3. Laurel Software, Suite 1234, 1310 College Avenue, Boulder, CO 80302 (303) 442-6363.

Billboard will display messages in colorful and large size characters readable even from 50 feet away. Features two display modes: Horizontal in which characters move from right to left, maximum of 6,600 characters; Vertical where short phrases or words scroll from bottom to top with a maximum of 60 lines. Permits special characters (music notes, trees, waves, triangles and various trimmers) to create effective and fascinating video text. High resolution graphics capability enables user to display pictures such as a company logo. User friendly message editing/compiling and preview features - \$34.95. Pacific Micro Systems, 794 Colleen Drive, San Jose, CA 95123 (408) 225-1285.

Environmental Systems Research Institute has developed a new software package for the analysis and **Mapping of Geographic Data**. Gridapple is a scaled-down version of their larger software mapping package used throughout the world. The Gridapple operates on an Apple II Plus and can be a self-contained system or connected to a host computer for input or display. Requires 48K, Pascal,

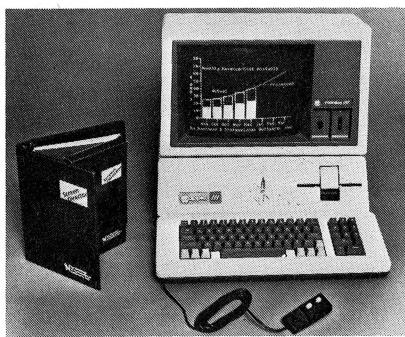
What would you give to have TURTLEGRAPHICS, with automatic scaling, and four graphic modes, including HIRES and LORES, on your Apple II?



SOFTECH
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a hard disk drive, and dot matrix printer - \$5,500. Distributed by IRIS International, Inc., 2701 E. Camelback Road, Suite 391, Phoenix, AZ 85016 (602) 956-9830.

The Screen Director, a new graphics software package from Business & Professional Software, Inc., lets a desktop computer function as a **Slide Projector Simulation** with a carrousel. It is used with another BPS package called Apple Business Graphics, and lets the user move from image to image with a Kodak hand-held slide projector switch while the audience sees the presentation on video monitors. For an Apple II or ///. Soon to be announced are further complements to Apple Business Graphics including a package called Target Image Maker that will permit remote generation of Hi-Res color paper copies, overhead transparencies and 35mm slides, and a printer/plotter installation kit that will give the dealer or user of Apple Business Graphics full flexibility in choosing output devices. Business & Professional Software, Inc., 143 Binney Street, Cambridge, MA 02142 (617) 491-3377.



From West Coast Consultants comes this array of **Software for the Houston Instruments Hi-Plot Plotter**. Curve II is a low cost graphics tool which provides general purpose two-dimensional hard copy graphics capability. BASIC source programs are fully accessible providing the user the capability to customize the programs. Features Cartesian, parametric, and polar equations, data points or keyboard characters, shaded horizontal and vertical bar graphs, fully scalable alphanumeric character set in normal or bold font, linear and logarithmically scaled axes, automatic centering of axis titles, exclusive control of scale number formats (decimal and/or scientific notation), linear and logarithmic error bars, universal shading routines, pie chart generator with optional exploded sector, bar graph routine, multi-pen support, dotted grid lines, enhanced length tic marks and enhanced curve traces, arc and circle generator routine, improved data entry with full editing capabilities - \$275. Other programs are Curve-Fit - \$75, Three-D - \$199, Curve

U.S.A. (plots hardcopy map of the United States with various options) - \$75, Curve Copy (Hi-Res Screen-to-Plotter dump routine) - \$75. For information contact: West Coast Consultants, 1775 Lincoln Blvd., Tracy, CA 95376 (209) 635-1780.

The A2W3D-1 **Three-D Graphics System** with 3D2 Enhancement package incorporates all of the features found in the A2-3D1 (define 2D or 3D objects in any size and orientation, manipulate position of the eye to view these objects from any desired perspective) plus a number of new features including: color lines (white, green, violet, blue, orange/red) and high-resolution (280 x 192) line generation; independent object manipulation that allows you to 'instance' an object definition anywhere within the limits of your defined 3D space; faster 2D line drawing and erasing; trig, multiply, divide, erase, point plot, line draw, and other routines to aid in overall simulation speed - \$84.90 (with A2-3D1). A2-3D1 owners may upgrade for \$24.95. A2-GE1 Graphics Editor gives Apple owners the ability to use these 3D graphics programs more effectively than ever. Includes Object Editor to create objects as you view them, Motion Programmer lets you animate up to five independent objects at one time, Slide Show Programmer and Playback allows you to enter and manipulate objects just as in Motion Programmer. You can take 'computer snapshots' for your presentation, complete with labels, for future playback. Viewing your slides is as easy as operating a carrousel slide projector - \$34.95 plus \$1.50 shipping. SubLOGIC Communications Corp., 713 Edgebrook Drive, Champaign, IL 61820 (217) 359-8482.



The **Graphics Processing System (GPS)** allows for the easy creation, editing and manipulation of images in the same manner that a word processor enables the easy creation, editing and manipulation of text. The standard version uses Apple compatible paddles or joystick and provides simple, step by step procedures in the program manual. The professional version accommodates minor modifications or major changes in design, mini-

mizes drudgery and frustration while maximizing the pleasure of creative experimentation. Images can be moved, rotated, changed in size or color, etc. With a printer, this program quickly produces hard copies. Compatible with the Apple Graphics Tablet, Houston Instruments HiPlot, and the Symtec Light Pen. Professional version - \$99.95, Standard version - \$59.95. Stoneware, Inc., 50 Belvedere Street, San Rafael, CA 94901 (415) 454-6500.

The **Illustrator** gives **Graphics Tablet Capabilities** and more to your game paddles or a joystick. Draw original artwork, fill with colors, add text and save it to your disk. If you already have the tablet, you're ready for the Illustrator's speed, brush sets, straight lines, color palette and incredibly fast fill. Switch between the tablet and paddles any time with the touch of a key - or use the keyboard for precision cursor control. All functions work with both the graphics tablet and the paddles. Menus are never more than a keystroke away - and most menu selections may be activated with a pen press on the tablet or a button push on the game paddles. Select brush styles for wide lines or for stamping single copies of the brush design anywhere on the screen. Create brush designs instantly, and add them to the menu - save custom brush menus on the disk for future use. Try 'what if' ideas and save your designs in various stages. You can use the Illustrator to design artwork, needlework and mock-ups. 17 billion possible color combinations (color patterns) mixed on the palette - or chosen from the color menu. Save custom color patterns to the color menu, and even save whole menus of colors to the disk for instant recall. Label your illustrations with the text generator - in any of the colors and in 4 different sizes - anywhere on the screen. Other character font sets may be loaded into the Illustrator for your use. Generates circles, boxes, frames and lines to your specifications. Make a stamp of your signature for the bottom of your original masterpieces. Make a collection of your favorite pictures to show to friends. Magnify feature permits you to easily identify and correct individual pixels - \$95. Island Graphics, Box V, Bethel Island, CA 94511 (415) 684-2664.



LANGUAGES (PROGRAMMING)

FORTH-79 was the first to meet the international standards established by the FORTH Standards Team in October 1980. Version 2 now offers several enhancements, including floating point and high resolution graphics. This new version is also portable; programs written for the Apple computer will run unchanged on CP/M and Northstar computers. Includes a screen editor, macro-assembler, strings, and 32-bit integer arithmetic. It also includes a professionally written 200+ page manual that guides the new or experienced FORTH user through the FORTH-79 language. This is a structured language that is ideally suited for systems and application programming on a microprocessor system. Programs usually run several times faster than in BASIC, and are very compact. FORTH provides a friendly, interactive environment for writing and testing programs. Interpreter, compiler, assembler, editor, and operating system are all co-resident. Apple enhancements are floating-point (including most common logarithmic and trigonometric functions), and high resolution turtle-graphics (with optional clipping). FORTH-79 with enhancement package - \$139.95. Micro-Motion, 12077 Wilshire Blvd., Ste. 506, Los Angeles, CA 90025 (213) 821-4340.

Now available for the Apple II are two copies of Krell's M. I. T LOGO. Features a utility disk containing M. I. T.'s extremely valuable demonstration material, a series of pre-defined shapes which may be substituted for the LOGO TURTLE, and Krell's timesaving library of predefined procedures. Includes Alice In Logoland, a twenty program tutorial series for intermediate and experienced programmers new to the LOGO language, The Technical Manual, *LOGO for the Apple II*, by H. Abelson & L. Klotz, a complete instruction manual for intermediate and advanced users of LOGO. The *Alice in Logoland* Primer, a step-by-step, lavishly illustrated introduction to LOGO for those who are new to both programming and to LOGO. A one-year free subscription to the Logo and Educational Computing Newsletter - a new authoritative source of information about the structure, classroom application and capabilities of LOGO, and an up to the minute forum on the most significant new ideas and issues in educational computing. For more information contact: Krell Software Corp., 1320 Stonybrook Road, Stony Brook, NY 11790 (516) 751-5139.

The Programmer is a Program Generator for the Apple II and IBM Personal computers. Through a series of menus the user can define what functions he wants his program to perform. The Programmer uses these selections to write lines of BASIC code which execute those specific functions. The end result is a program

**What
would you give
to develop programs
for the
IBM PC,
TRS 80 Model II,
T.I. 99/4
Home Computer,
and Xerox 820
on your
Apple II?**



stored on disk which can also be copied onto other disks. Among its countless other uses, The Programmer can be used to develop a mailing list, or generate graphics. Programs can be chained, the user can write to any RAM address, or create sort routines with minimal effort. Branching, whether on error, specified keystroke, menu selection or a time delay is handled by single menu selection. Requires an Apple II with Microsoft Z80 card, 80 Column Card, and 48K RAM. Scheduled to be released soon is the Apple II version with Applesoft or Apple II Plus. Retails for \$495 through local dealers. For information call (800) 348-8558 or in IN (219) 879-4693. Advanced Operating Systems, 450 St. John Road, Michigan City, IN 46360.

MUSIC

Without using an add-on circuit board, The Electric Duet plays two simultaneous notes through your Apple's built-in speaker or an amplifier or stereo connected to the cassette tape output. The Electronic Jukebox allows you to select and play any or all of the pieces saved on disk. You can build a music library on several disks, and play any piece from any of these disks from the Jukebox. The Piano lets you play directly, using the Apple II keyboard as a piano keyboard. The Music Editor is where you create and save your own works. Notes can be entered either by name, or by using a 'piano' mode and simply playing them into memory. You can have the editor play any or all of the notes in memory, or play each note as it is entered. The Transpose command allows you to transpose all or part of a song in either pitch or duration. The finished song is then saved to disk, where it can be played using the Jukebox or edited further at any time. In addition, music created with The Electric Duet can be played from your own programs using a special player module which your program loads into memory, then calls - \$29.95. Insoft, 10175 S. W. Barbur Blvd., Suite 202B, Portland, OR 97219 (503) 244-4181.

UTILITIES

AED Program Editor supports character insertion, single and multiple character deletion, line truncation, instant cursor positioning to a specific character, the beginning, or end of any Applesoft line. All editing functions are in effect while entering new Applesoft statements as well as revising existing lines of your BASIC programs. String searches leave you in place for editing. Global search and replace and wildcard characters are supported. User defined ESCAPE MACROS insert commonly used Applesoft words

and phrases into the line being edited by pressing **ESC** and a single key. Automatic line numbering with user specified increment. Sophisticated LIST control permits page-at-a-time, line-at-a-time, fast and slow speed scrolling of Applesoft lines. AED remains resident while **RUNNING** your Applesoft programs. Single key-stroke exit from AED; reentry to AED via '**&**' (ampersand) or pressing **RESET**. Single key command displays the names and values of each Applesoft simple variable (very useful in debugging). Direct keyboard entry of special characters not found on the Apple keyboard. Single key **HELP** screen and **ESC** **MACRO** menu even while editing a line. User friendly. All Assembly language uses 5K RAM. Requires an Apple II with 48K RAM, Applesoft ROM, and DOS 3.3 - \$40. Linn Software, 3199 Hammock Creek, Lithonia, GA 30058 (404) 483-7637.

Add memory to CP/M with the new **CP/M Fast Disk Program** from Legend Industries, Ltd. Now for the first time, every bit of RAM on the Legend 64KC card can be used as a very fast, solid state disk drive! The CP/M Fast Disk allows you to configure a large, very fast RAM-based disk drive. As you add Legend cards, the size of the E-drive increases, supporting up to 512K bytes of memory. The program supports most Apple CP/M programs. At your local dealer or contact Legend Industries, Ltd., 2220 Scott Lake Road, Pontiac, MI 48054 (313) 674-0953.

Text to DIF Converter for the business user who already has VisiTerm or Data Capture, and who wants to get at data from another system without a lot of hassle, VC-Loader can be used to put data from DRI, The Source, or any timesharing system directly into VisiCalc or VisiPlot or any program accepting DIF input. VC-Loader uses VisiCalc like commands to allow you to move around your text file and mark the rows and columns you want to save. No messing with character positions, no complex commands - \$65. Requires an Apple II Plus, Applesoft in ROM. Micro Decision Systems, P. O. Box 1392, Pittsburgh, PA 15219 (412) 276-2387.

Apple II Pascal users may now retain full use of their machines while printing without any hardware modification or expensive peripherals using this **Pascal Printer Buffer Program**. Works with virtually any printer and interface, has no limitation as to size of file, uses less than 1K of user memory, allows printing to be started anywhere in the text file, needs no support from any other product; just use your version 1.1 Pascal. This is the first software spooler to run on an Apple II under Pascal - \$49.95. For more information contact: SRS Creative Marketing, P. O. Box 484, Santa Barbara, CA 93102 (805) 687-5331.

This package contains programs to set up a turnkey **Memory Management System** for the Apple, making use of either one or two 16K memory-expansion boards. One of The Manager programs, HIDOS, loads the Apple DOS onto a 16K RAM card, thus freeing a normally-occupied 10.5K of memory space on the Apple motherboard for use by any program. The Manager will alter a copy of the Apple System Master Disk so that its utilities (FID, Renumber, etc.) make full use of the extra available memory. HIDOS goes on to look for a second 16K card, and if found, automatically loads an alternate language onto it. Another program on the disk, SOLIDOS, makes a 16K card into a small (45-sectors) but powerful disk-drive emulator. Files loaded onto this 'little disk' are accessible almost instantaneously for sorts, searches and calculations. The Manager - \$34.95 suggested list price, either from local dealers, or direct from Omega MicroWare, 222 S. Riverside Plaza, Chicago, IL 60606 (312) 648-4844.

Universal Boot Initializer (UBI) initializes DOS 3.3 or 3.2.1 disks that load a RAM Card on boot in 1.7 seconds. UBI-initialized disks will **RUN** (**BRUN** or **EXEC**) one of two **GREETING** programs supplied by the user. Built in error handling capacity ensures execution of correct **GREETING** program whether one **BASIC** or both **BASICs** are available. Obsoletes use of Apple's **BASICs** disk and DOS 3.3 System Master disk for fast single-disk direct booting. Features an enhanced DOS with super fast program loading. The DOS 3.2.1 UBI-initialized disk boots on either 13 or 16 sector PROMS. Multiple copies of UBI-initialized disks can be made with standard copy programs - \$49.95. **Amper-Sort/Merge (A-S/M)** can sort 1,000 records in seconds. General purpose Disk Sort/Merge Utility for Apple DOS 3.3 text files. M/L Read, Sort and Merge for speed. Sorts up to five input files into one output file. Sorts random or sequential files alphanumerically (Ascending or Descending) up to five fields. Merges two to five pre-sorted files into a single file. Compatible with most data base programs that create standard DOS 3.3 text files - \$49.95. S & H Software, Box 5, Manvel, ND 58256 (701) 696-2574.

Master Diagnostics Plus will examine every functional operation of your computer, detect errors, and report any malfunctions. Besides the diagnostics part of the analysis, Master Diagnostics Plus provides routines for complete internal and external maintenance of your computer, its peripherals and monitor. Features disk drive speed calibration; head cleaning kit and programmed routine; motherboard ROM test; Applesoft card ROM test, other card tests, DC Hayes Micromodem II;

Would you give \$295?

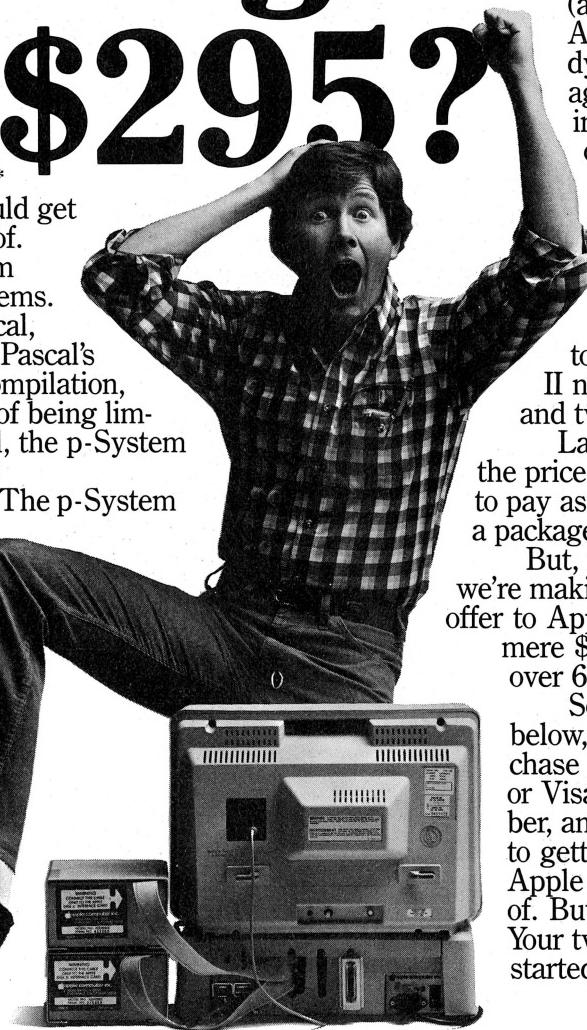
If you're currently using Apple Pascal* on your Apple II, you're probably aware of some noticeable limitations. And you'd probably give a lot for an upgrade package, including the UCSD p-System*, UCSD Pascal* and TURTLEGRAPHICS, that would get your Apple* to do what it's capable of.

Upgrade to the UCSD p-System Version IV from SofTech Microsystems. It's got all the features of Apple Pascal, and then some. For instance, Apple Pascal's UNITS must be linked in at each compilation, the p-System's do not. And instead of being limited to 32 UNITS, like Apple Pascal, the p-System allows a virtually unlimited number.

How about peripheral support? The p-System supports all the peripherals that Apple Pascal does, plus a clock, and a lower case adapter. And, we get more out of the peripherals you've already got—shiftware modification on the keyboard, alpha lock key, typeahead and characters not even on the Apple keyboard.

And when it comes to graphics, our TURTLEGRAPHICS has everything in Apple's graphics, plus automatic scaling and four graphic modes, including both HIRES and LORES.

Then there's portability. The p-System lets you develop genuinely portable, high-level applications for nearly any microcomputer around. It allows you to work in any combination of UCSD Pascal and BASIC



(available as an add-on). And it provides support for dynamic memory management and multitasking, with a full arsenal of enhancements. And if that isn't enough, your existing Apple Pascal programs are upward compatible with the p-System, and simply have to be recompiled to execute. All your Apple II needs is 64K of RAM and two disk drives.

Last but not least, there's the price. Normally, you'd have to pay as much as \$825 for such a package.

But, for the next two months, we're making this special upgrade offer to Apple Pascal users for a mere \$295. That's a savings of over 60%.

So just send in the coupon below, with your proof of purchase and check, money order or Visa or MasterCard number, and you'll be on your way to getting more out of your Apple II than you ever dreamed of. But you'd better hurry. Your two months have already started.

Okay, SofTech Microsystems, here's my \$295. I want my Apple II to have software it can really appreciate.

My check is enclosed

Please charge to my Acct. # _____

Visa Master Charge Expiration Date _____

Name on card _____

I hereby certify that I am an Apple Pascal Owner.

Signature _____

Name _____

Title _____

Company _____

Telephone _____

Ext. _____

Address _____

City _____

State _____

Zip _____

OFFER VALID JULY 1 to AUGUST 31, 1982

(California residents please add 6% sales tax [California Transit District—6.5%] Massachusetts residents please add 5% sales tax.)

*UCSD p-System and UCSD Pascal are trademarks of the Regents of the University of California. Apple, Apple II, and Apple Pascal are registered trademarks of Apple Computer, Inc.

SOFTech MICROSYSTEMS

Please send coupon to: Apple Upgrade Dept.
P.O. Box 27179, San Diego, CA 92128
Or call (714) 578-6995

My proof of purchase is
 invoice receipt disk label other

parallel card PROM; monitor skew; Hi-Res color; speaker function; internal maintenance and many more. Procedure manual is provided as is a head cleaning kit with cleaner and cleaning wands - \$69.95. Nikrom Technical Products, Inc., 225 Prospect Street, Leominster, MA 01453 (800) 835-2246.

The BUG is a sophisticated, yet easy to use **Assembly Language Diagnostic Aid** for getting the bugs out of your Assembly language programs. If you are a novice just getting started with Assembly-language programming, you will also find The BUG helpful in developing your understanding of how the Apple's 6502 internal processor operates. The many display options of The BUG will permit you to try out your Assembly-language programs at the speed that is most comfortable for you. The BUG will also make it easy for you to see the effect of your program on the Apple as it executes. The BUG offers the easiest to use and most extensive breakpointing capability of any 'debugger' available for the Apple. Up to 13 different breakpoints can be specified to halt program execution. Supplied with a 40-page user guide The BUG is designed for use with DOS 3.3 on either the Apple II or Apple II Plus computer - \$50. Sensible Software, 6619 Perham Drive, West Bloomfield, MI 48033 (313) 399-8877.

Lock-It-Up 4.1 will take a standard DOS 3.3 diskette, **Copy-Protect Your Disk**, and then allow rapid duplication of the product (less than 70 seconds each). Not only does this software protect against all standard copy programs, it also protects against all 'nibble' copy programs currently available as of March 1982 including Locksmith 4.1, Back-It-Up, Clone, Omni Copy, Nibbles Away, and Copy II+, among others. This system incorporates over thirty state-of-the-art copy-protection features making it highly unlikely for 'nibble' copiers to be able to copy these diskettes in the near future. Includes a 'semi-hardware' modification, making it unlikely for anyone to successfully copy the protected program even in the future - \$195 one time fee. Requires Apple II or II Plus with Applesoft in ROM and DOS 3.3. Double-Gold Software, 13126 Anza Drive, Saratoga, CA 95070 (408) 257-2247.

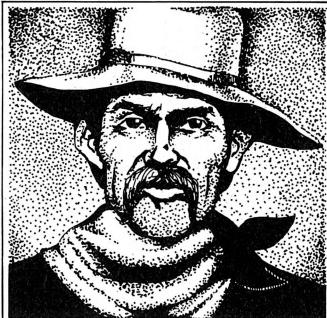
Datalok provides two basic utilities for the user: the ability to **Encrypt and Decrypt any File** created under Apple DOS - i.e., TEXT, Integer, Binary, Applesoft, etc.; and the ability to lock and unlock an entire disk. This can render a disk inaccessible and unbootable to an unauthorized user. Provided also is a diagnostic program enabling the user to verify the system's operation while providing expertise on DES for the inexperienced user - \$349. Atlantis Computers, 31-14 Broadway, Astoria, NY 11106 (212) 728-6700.

Using this **Relocating Linking Loader** you can take up to 50 machine language files that are R files generated by the Editor/Assembler in the Apple DOS Tool Kit and link them together into one program at an address you specify. Or you can take files from a library of Amper routines like the Language Plus series and make up a custom machine language package, linked together for quick loading. They may be accessed through BASIC. Can combine Quick-sorts with Input, add De-allocate an array and Amper match, plus much more. Make a pack of over 30 routines designed just for you. Available now in combination with Language Plus I and Language Plus II at \$150. At your local dealer or contact: Micro Lab, 2310 Skokie Valley Road, Highland Park, IL 60035 (312) 433-7550.

WORD PROCESSING

This latest development in **80-Column Word Processing Software**, from Muse, features sophisticated functions, including the option to display an 80 column screen with the use of a Videx 80-column Board, and to insert page headers and footers. Most functions have been reduced to single key commands. Other pluses include a multi-file search-and-replace function, a display of disk space availability, a user definable key allowing you to define words or phrases up to 30 characters long with one key, and the ability to count occurrences of specific words or phrases in your files. **Super Text** also boasts an enhanced math mode, split screen option, advanced block operations, and Autolink of multiple files. Documentation that has been redesigned with the beginner in mind as well as the sophisticated user, is included with the program. Super Text is an elegant experience in word processing that must be used to be appreciated. It utilizes the Apple II or II Plus computer and retails for \$175. From your local dealer or Muse, 347 N. Charles Street, Baltimore, MD 21201 (301) 659-7212.

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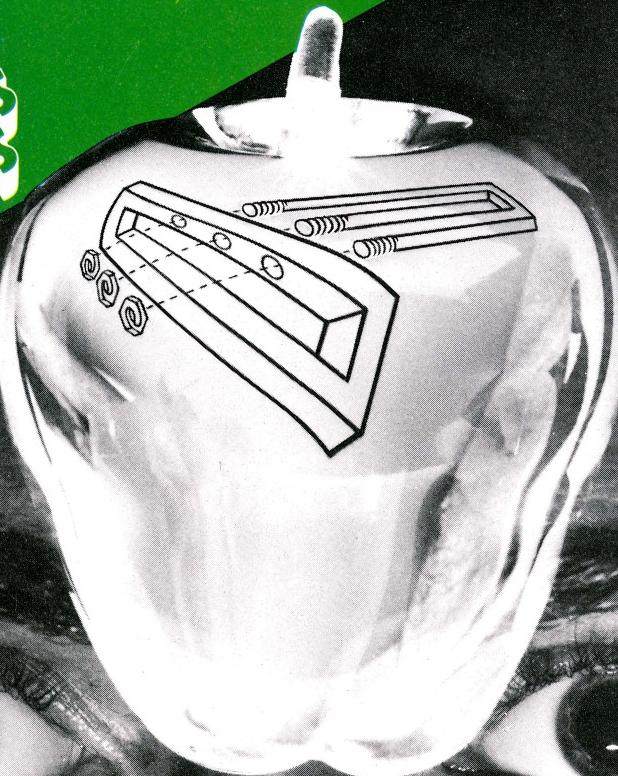
MISCELLANEOUS

The International Software Database is now available on-line through Lockheed DIALOG, thus becoming the first and only comprehensive database of computer software. As with the hardcopy it is fully searchable by machine, operating system, subject, vendor and price. Also, with this on-line service through Lockheed, it has full text searching by key words in any or all fields. This versatility helps you to find exactly the piece of software you need to run on the system you have and within the budget allowed. In hardcopy the International Software Directory is available in

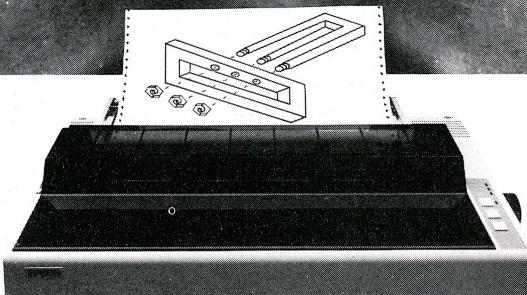
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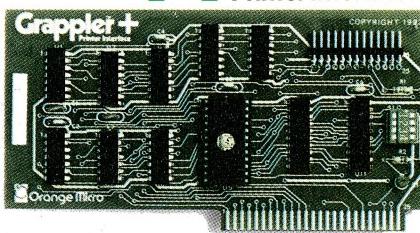


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The original Grappler was the first graphics interface to give you hi-res screen dumps from your keyboard. The new Grappler+ with *Dual Hi-Res Graphics* adds flexibility with a side-by-side printout of page 1 and page 2 graphics.

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two volumes: 1) The International Micro-computer Software Directory which lists more than 7,000 software packages for microcomputers and is available for \$39.95 plus postage and handling; and 2) The International Minicomputer Software Directory which lists over 3,000 software packages for minicomputers and is available for \$64.95 plus postage and handling. For more information, or to order a directory contact Imprint Editions, 1520 South College, Ft. Collins, CO 80524 (303) 482 - 5574.

The Wine Cellar Inventory Program is for wine buffs. It allows enthusiasts to manage certain information about their wine and manipulate this information from day to day. Up to 400 unique wine types can be kept on the program diskette along with 800 additional types on a second disc. Each type can contain up to 2,700 cases in the inventory. Graphics are used to provide information about a wine's availability, rating and drinkability. Wild card searches of the cellar provide snapshots of inventory while any particular entry can be considered... considered... looked at in detail. Statistics of the cellar can be displayed and inventories printed. \$49.95. CA residents add \$3. WE Software, 800 Greenwich Drive, Chico, CA 95926.

Books/Catalogs

Speaking Pascal: A Computer Language Primer by Kenneth A. Bowen is written in a non-mathematical language that requires no technical background or previous programming experience on the part of the reader. After a brief introduction to the structure of computers and the problems of programming languages, the text explains various components of Pascal. Elementary and complex data types are covered along with the use of control structures, procedures and functions. Bowen uses structured programming techniques to develop programs. In addition to exercises at the end of each chapter and numerous examples, an appendix is included on USCD Pascal - \$11.95. Hayden Book Company, Inc., 50 Essex Street, Rochelle Park, NJ 07662 (800) 631 - 0856 in NJ (201) 843 - 0550.

This **Computer Products Catalog** contains forms to help you more efficiently do your job. Includes video layout, general purpose flow charts, printer layout, printer overlay, paper porter (run single sheets through your sprocket driven printer), Cobol coding sheets, form-start (starts the first check or invoice), SuperCalc or VisiCalc sheets, Apple Data Base Master forms, and data file layout forms. Beeline Services, 211 E. Allegan Street, Otsego, MI 49078 (616) 694 - 6424.

SYBEX Books are designed to be educational and effective. Edited, typeset, and manufactured internally except for final printing. Their catalog contains books of general interest, CP/M, Hardware, Pascal, Programs for Scientists and Engineers, 6502 Microprocessor, APD, Z80 and Z8000, Word Processing and Self-Study Courses. Sybex, 2344 Sixth Street, Berkeley, CA 94710 (415) 848 - 8233.

Electronic Supermarket catalog carries all sorts of useful and interesting items for experimenters: printers, printer mechanisms, acoustic coupler/modems, microwave dish antennas, siren drivers, alarms, cable TV items, IC's and other semiconductors, relays, cable and wire, switches, connectors, meters, cabinets, keyboards, consoles, computer interfaces, fans, transformers, clocks and fans (need to cool down your Apple?), audio components, etc., etc. Electronic Supermarket, P. O. Box 619, Lynnfield, MA 01940 (617) 532 - 2323.

A new list of **Independent Field Service Repairmen** has been published and is now available through Field Service Merchants Group. The listing identifies individual technicians across the country who have gone into the computer repair business on a local basis. Most of the independents listed do 'technical messenger' services in the remote areas of the United States - that is, they travel to the site, disconnect and ship back to the manufacturer the bad part or unit, and install the new part at a fraction of the cost the manufacturer would spend if he did it himself. More than 250 listings are included covering 60 cities and 42 states. Includes the independent's name, address, and phone number and allows the manufacturer to contact the independent directly to negotiate service at the independent's locale. The list costs \$175. Field Service Merchants Group, 224 Walthery Avenue, Ridgewood, NJ 07450.

Computer Newsletter Publisher's Directory allows individuals, organizations and firms an up-to-date list of this exploding source of information. The Directory, in loose-leaf 8 1/2 x 11 -inch format, lists over 600 computer related newsletters as of May 1, 1982. Over a hundred of these newsletters are available free for the asking. Many of the newsletters issued by computer clubs are available to other clubs on a swap basis. Due to the explosive growth of this field the Directory includes at least a bi-monthly up-date. The Directory also has articles pertinent to those now issuing, or interested in issuing newsletters. The Directory shows how newsletters from even small clubs, when made available to the public, can be a profitable business - or at least 'pay their own way'. An end-of-the-year Cumulative

II for Apple II

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VERSAbox

The only intelligent SPOOLER/BUFFER with an optional REAL TIME CLOCK interface/display. For use with all Centronics parallel and RS-232C INPUT/OUTPUT interfaces.

VERSAbox's high-speed input combined with up to 60K buffer (more with character compression) frees up your computer from the slow job of printing. Modems and other compatible devices can also be buffered. Multiple software-selectable outputs permit you to choose between two or more VERSAbox outputs or use them simultaneously. You can buffer multiple inputs simultaneously too.

Add the optional REAL TIME CLOCK to VERSAbox and you get a six digit LED numeric time display. Your computer can read the time via the RS-232C port. Another useful option is the SWITCHED 120V SOCKET that can turn external devices on and off by clock control.

VERSAbox is supplied in an attractive, compact 11" wide, 8" deep, 3" high cabinet. Interface cables are available from your dealer or Prometheus. SPECIAL OFFER for Apple II owners: Buy a VERSAbox this month and you will receive a free parallel interface and cable.

VERSAbox, standard model with Centronics parallel INPUT/OUTPUT only and 16K buffer \$249.00

VERSAbox, with both Centronics parallel and RS-232C INPUT/OUTPUT and 16K buffer \$299.00

REAL TIME CLOCK option with DISPLAY add \$150.00

SWITCHED 120V OUTLET option add \$50.00

Additional 16K BUFFER MEMORY KITS each add \$50.00

I. VERSAcard

Four cards on one for Apple II. (1) Serial Input/Output Interface, (2) Parallel Output Interface, (3) Precision Clock Calendar, and (4) BSR Control. All on one card with TRUE SIMULTANEOUS OPERATION.

Before you buy Mountain Computer CPS or any other multifunction card, ask these questions:

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Does it have interrupts?

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Does it have BSR control?

Can I use DB Master? Ascii Express? VISI Dex? Easy Writer? WORDSTAR? Z-TERM PRO? VISITERM? . . . other software packages?

If the answer is YES to all of the above, then you're talking about VERSAcard and ONLY VERSAcard. And, the list price has been reduced by \$50 to **\$199.00**

SPECIAL OFFER: Buy a VERSAcard and we'll sell you GRAFTRIX, a sophisticated screen dump graphics package, with \$25 off the regular list price of \$65 for only **\$40.00**.

II. AUTO-DOC

An automatic diagnostics system for your Apple II computer. Get a complete check of your critical Apple hardware EVERY time you power-up.

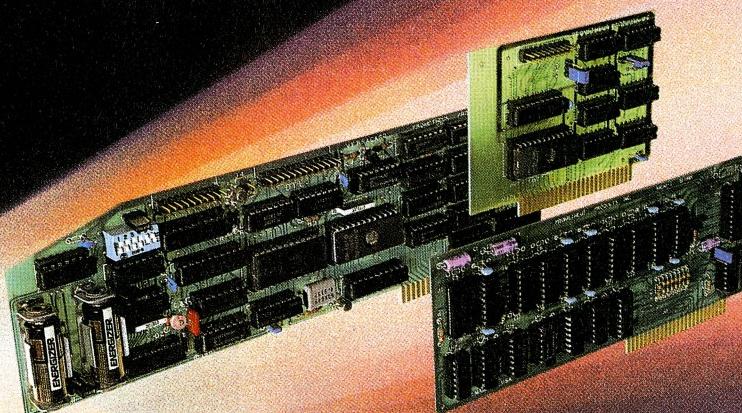
AUTO-DOC saves TIME, ENERGY, and MONEY by identifying problems in your Apple before they make themselves known by system failures. And, you don't have to remember to insert a disk. DOC automatically identifies system problems before you run your programs by doing extensive system diagnostics. If DOC finds a failure, it indicates the problem area and, in some cases, the specific chip or component that's responsible.

DOC includes a memory test, processor test, ROM test, and more. In addition, extensive disk based diagnostics are included for further testing and subsystem checks for many popular peripheral cards.

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Index is included which will cover materials by subject, title and author of any computer newsletters submitted to the publisher. The 1982 Cumulative Index will include materials from computer newsletters from 1980, 1981 and 1982 which are submitted for inclusion. The Directory and Cumulative Index are expected to be on-line by the end of this year. The Directory is \$70 from A. R. Alaways, 306 West 46th Street, New York, NY 10036 (212) 799-9190. Add \$5 for postage outside the U.S.

Vocational Handbook A conference is being planned for all persons interested in microcomputer applications to vocational education programs. The conference is being coordinated by the Vocational Studies Center, University of Wisconsin-Madison. It will be held at the Sheraton Inn, Madison on August 12-13, 1982. Educators will have access to both computer information for beginners and more advanced applications of software programs to vocational education curricula. In addition, a handbook and informational packet containing information on a variety of topics will be distributed at the conference. Conference registration fee \$35. It is possible to order the handbook for \$20 if you are unable to attend. Contact Judy Rodenstein (608) 263-4367 or Roger Lambert (608) 263-2704 at the Vocational Studies Center, 964

Educational Sciences Building, 1025 West Johnson Street, Madison, WI 53706.

Software Vendor Directory is a research and reference document of indexed listings for more than 1,800 software vendors, 123 hardware vendors and 22 operating systems. The 1,800 vendors provide 12,300 software products classified into 300 categories. The Software Vendor Directory is the original completely cross referenced directory dedicated exclusively to the microcomputer industry. Published every six months, they offer a subscription update service to all of their customers. The Directory is also available on disk. It uses a software product named IC-IRS by Island Cybernetics and runs under CP/M. It is provided on two 8-inch single sided, single density IBM standard disks. The Software Vendor Directory is provided in an attractive, sturdy three ring binder for \$57.95 for a single copy. The Subscription Update Service is available for \$100 which includes the current edition plus two completely revised editions throughout the year. The Disk is only available with the Update Service for \$260 (replaced twice throughout the year). Prices include shipping and handling within North America. Overseas orders outside North America please add \$20 (U.S.). Micro-Software Services, Inc., P. O. Box 482, Nyack, New York, NY 10960 (914) 358-1340.

To help schools and particularly the schools' decision makers - school board members and school administrators - move effectively into the new technology, Far West Laboratory's Educational Technology and Communication Department is publishing a newsletter, **ETC: Educational Technology and Communication**. Each month, ETC provides: timely and unbiased information about educational uses of new technologies; case studies of schools successfully using microcomputers, interactive videodiscs, and other new technologies in classroom and administrative applications; analyses of issues facing educators as they bring technology into the classroom; answers to readers' questions on issues involving new technology and education; how-to advice on such topics as purchasing equipment and developing computer literacy requirements; resources useful to educators; and news of upcoming conferences, seminars, and workshops. ETC is published monthly - \$36 for one year or \$60 for two years. ETC, Subscription Department, Far West Laboratory, 1855 Folsom Street, San Francisco, CA 94103 (415) 565-3151.

Miscellaneous

A new **Static Control Floor Mat** for information-processing locations is now available from distributors of Scotch brand magnetic media and accessories. In earth-tone brown, designed to complement most office decorating schemes, the new 9453 Static Control Floor Mat from 3M's Data Recording Products Division also offers improved construction for greater durability. Non-skid fastening strips on its back surface eliminate movement and curling, 3M says. A 15-foot grounding cord connects to a reliable ground. The mat measures 4 by 5 feet, with a 30-inch lip to project under a desk or work station. Static control has become essential in locations where electronic systems are in use - \$310. 3M, P. O. Box 33600, St. Paul, MN 55133 (612) 733-9572.

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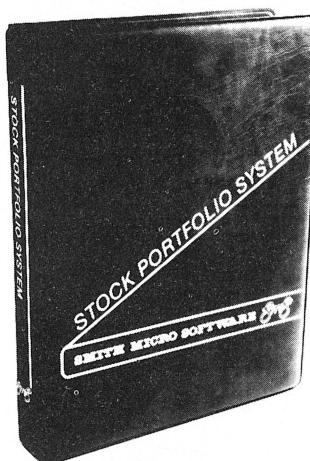
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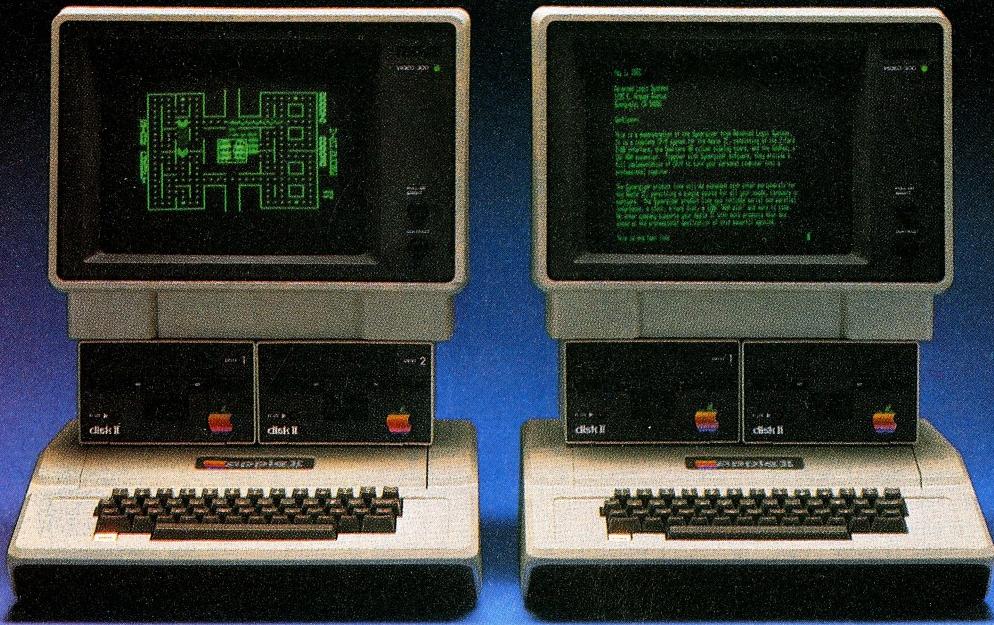
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The CP/M Handbook is copyrighted by Sybex, Inc.
And the SYNERGIZER was our idea.

*All SYNERGIZER Components are also sold separately.

Rocky Mountain Computer Camps, to be held at Wild Basin Lodge in the mountains 65 miles west of Denver, are dedicated to teaching today's young people skills and tools that will assist them in meeting the challenges of tomorrow's world. The two-week residential camps offer a rich blend of computer studies, environmental education and outdoor adventure. They are offered by the Education Division of the Boulder Computer Resources Center. BCRD, established in 1981 for the purpose of providing access to personal computers, has available on-site 12 Apple, IBM, VectorGraphic and Atari computers on an hourly rental basis. The Center also offers diversified computer training programs for all ages which include classes and private instruction in the fundamentals of computers, programming, and how to apply computers in business and the home. The Camps will be offered three times during the summer. Each camp session begins on a Sunday afternoon and ends on a Saturday morning. For a brochure, contact BCRC at 1005 Pearl Street, Boulder, CO 80302 (303) 442-6228.

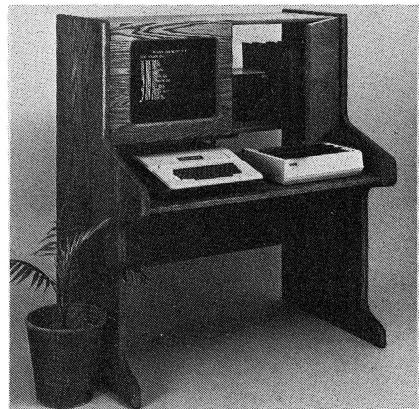
Byte Punch Diskette Punch permits you to use both sides of your diskettes thereby doubling your storage space without buying more diskettes! Just insert the diskette in the Byte Punch, push down on the lever and you are ready to save files on both sides of your diskette. This is a desktop device with sufficient mechanical advantage to make the punch operation a snap. Precise registration of the notch is guaranteed. It produces a square notch that is indistinguishable from the one on Side A. (Warning: will void the disk's warranty.) \$17.95. The Olive Branch Association, Ltd., 1426 W. Winton Ave., Hayward, CA 94545 (415) 887-4716.

Atlantic Cabinet Corp. has a range of **Work Stations** designed specifically to house all micro-computers. Delivered heavily packed, in self-assembly form needing only a Phillips screwdriver and a few minutes of your time to assemble. Manufactured from 1-inch all wood particleboard surfaced with hard-wearing melamine veneer, and available in either Oak or Walnut. All models have a discreet rear slot for wiring which can also be used as a paper in-feed. Overall height is 36" and depth 25", standard on all models. 50" wide Bi-Level - \$185; 50" wide Split Level - \$195; 30" wide Bi-Level - \$130; 28" x 18" extension - \$65. Maryland residents add 5% sales tax. Atlantic Cabinet Corporation, P.O. Box 100, Interstate Park, Williamsport, MD 21795 (301) 223-8900.

CompuCover is the original **Computer Cover** company. CompuCovers are attractively designed covers made from cloth backed vinyl. This combination of elegance and protection makes CompuCover the standard in computer covers. In addition, CompuCovers are flexible for easy storage; custom fitted for each piece of your computer equipment; unobtrusive to computer cables or connectors; and may be wiped with a damp cloth. Apple II - \$12.95; Apple II Disk - \$3.95 or two disks - \$7.95; Apple /// - \$12.95 or \$15.95 with Monitor ///. For handling, include \$1 per cover with a \$1.50 minimum. Outside America: for AirMail include \$2 per cover with a \$4 minimum. CompuCover, P.O. Box 324, Mary Esther, FL 32569 (904) 243-5793 or (800) 874-6391.



The **Desk-Top Apple Center** is finished in a textured polyurethane coating for superior appearance and durability (all metal construction). The colors match those of the Apple computer and its keyboard. The monitor shelf positions the monitor at a comfortable angle to reduce eye and neck strain. The shelf itself is formed to allow maximum ventilation to the monitor. Flat top design for your printer or other monitor creates even more work space. Also holds two disk drives. Diskette storage slot can comfortably hold up to 9 diskettes for quick and easy access, increased workspace. Dimensions are 15 3/4" wide x 15 1/2" high x 13 3/4" deep. Mounting holes located on the bottom lip of the Apple-Center can be used to secure your Apple system for complete protection. The key locking on/off switch gives you total control over the use of your Apple system. Conveniently located on the left side of the Apple-Center, it switches power to three outlets located on the back panel. Surge protector incorporated in the Center constantly monitors incoming voltage for transients. Cooling fan provides up to 35 CFM. Ventilation slots are also located on the front, rear and sides of the Apple-Center - \$249.95. Doss Industries, 1224 Mariposa Street, San Francisco, CA 94107 (415) 861-2223



'Electroniture' **Computer Furniture** features solid Oak construction with much attention to detail and a distinctive design. Hand rubbed Danish Oil Finish with two coats plus wax. All exposed edges have been correctly worked to rounded corners and edges. Classic lines to complement your existing interior design. Engineered and designed for maximum user comfort, non/glare anti-reflection glass between you and the monitor. Provides a large work surface with additional storage space, and a document holder. Will accommodate the Apple II or /// and most other computers as well. Maximum monitor size 15.4" high, 30" wide, 16" depth. Will accommodate up to six 5 1/4" floppy disk drives and many peripherals such as modems, graphics tablets, Corvus hard disk, etc. For information contact: The Bench Collection, 1387-D Cass Road, Santa Rosa, CA 95401 (707) 526-1074.

The **APPLE CRATE** product line includes low cost, high quality, **light weight cases** for **Apple Computers** and disk drives. The cases are constructed from a light weight, water proof material called Cordura, used in the design of mountaineering and back packing equipment. 3/8" closed cell foam provides the cases with both shock and vibration protection. The cases are compactly constructed to fit under airline seats and each case comes with an adapter to allow you to connect the computer to any Hotel/Motel TV. The disk drive case can be carried attached to the computer case or separately if you choose. The cases are made in the USA and are available at computer stores or directly from Abcom. The computer case with an accessory packet and case for two disk drives sells for \$92 with a 120 day limited warranty. They also produce the Apple Skin, a nylon dust cover for combinations of computer, disk drives and monitor; custom cases; camera bags and Apple Crate matching travel accessories such as hang-up bags, soft brief cases, shaving kits and utility bags. Abcom Corporation, 16005 Sherman Way, Suite 105, Van Nuys, CA 91409 (213) 891-3669.

Buffer Overflow

From our Intrepid Reporter...

Dear Peter:

You'll recall that things got so frustrating out at the Boston Applefest, what with no new product announcements from our friends at Cupertino, that I decided to track down a rumor about something happening over on the other side of the Charles River. I left Hynes Auditorium, made sure I had another nickel (I'm an old Kingston trio fan), descended into the bowels of the Copley Square Station, and took the Red Line and the Green Line (or vice versa) over to Cambridge, to check in with Software Arts, Inc., "the creators of VisiCalc".

After threading through a phalanx of security guards, I made it to the Twelfth Floor, where a group of very pleasant people assured me that they *absolutely* could not comment on what was to happen the following Monday morning. One senior Software Arts official (not one of the two "seniorest", however), who, for the purposes of this memo, I'll call "Deep Floppy", broke down enough to allow as how there would be the announcement of a new piece of software which would be every bit as revolutionary as VisiCalc.

Throughout the weekend, as you know, I attempted to get more information. I even went to the extent of attempting to bribe Deep Floppy with a drink at the cash bar at the Exhibitor's cocktail party Saturday night. All to no avail. So it wasn't until I read a newspaper, which for purposes of this memo I'll call the *Wall Street Journal*, on Tuesday morning, that I learned of Software Arts' announcement of "TK!Solver". You of course have seen the article and the press release. The program, to be available for the Apple (presumably the II and //) in the Fourth Quarter for \$299., will accept formulas, and series of formulas, and will solve for the unknown.

Well, that didn't say as much as I would like, so I thought I'd give Deep Floppy another chance, and phoned for more information. DF was still reluctant to say anything definite about the program that had not been stated in the press package (why bother to announce something, and then not talk about it?), so there was nothing more to do than to outline *my* concept of the program (as gleaned from the Press Release) and to ask Deep Floppy to stay on the line if I was right, and to hang up immediately if I was wrong.

Me: "I understand that a user could tell TK!Solver a formula, and some of the variables, and have it solve for

the missing parts of the formula. Thus, Ohm's Law could be inputted:

$$\text{Volts} = \text{Amps} * \text{Resistance}$$

... and if you then inputted Amps and Resistance, TK!S would solve for Volts. But if you only gave it Volts and Amps, TK!S would automatically solve for Resistance, without user transformation of the formula."

Well, Deep Floppy didn't hang up, so I continued on.

Me: "Further, resistance could be stated as several parallel resistances, inputting the formula:

$$1/\text{Resistance} = 1/R_1 + 1/R_2 + 1/R_3$$

... or series resistance:

$$\text{Resistance} = R_1 + R_2 + R_3$$

... and once again, TK!S would save the day."

DF: (Silence.)

Me: "And if you haven't specified a sufficient number of the variables, TK!S would complain that it didn't have enough information, and would request more."

DF: (Silence.)

Me: "Will the program be very user-friendly?"

DF: (Opening up at last) "Can you imagine us putting out a program that *wasn't* user-friendly?"

Well, Software Arts has only published one other program thus far, and while it is an excellent one, there are some features which aren't quite as "user-friendly" as I would like. But assuming that TK!Solver is only as good in that area as VisiCalc, it wouldn't be bad.

So that's the story on what Dan Bricklin reportedly said would be "as important to the industry as VisiCalc was." At the moment it's speculation, but it sounds to me that you'd better start saving up to shell out that \$299 purchase price in the Fourth Quarter. Or sooner. Or later.

I know that I will.

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Intrepid Reporter

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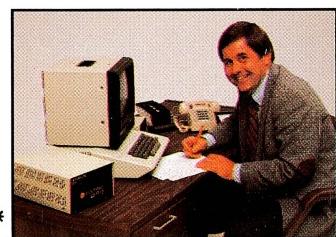
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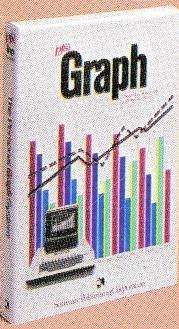
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